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WASTING IN INFANCY*

BY

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The subject of wasting in infancy is so vast that the approach to it, and the direction of thought for considering it at a meeting of this kind, is not very easy. When one refers to the literature, one becomes quite bewildered by its extensiveness and the variety and conflict of opinions expressed by the various authorities. An enormous number of most valuable observations and investigations on nutritional disturbances have been carried out at home and abroad by a host of workers, and yet it seems impossible to arrive at any definite conclusion with regard to many of the problems. I can only attempt to offer a brief and general outline, which I hope will serve as a basis for discussion.

By the term "wasting" I take it that we mean a condition of malnutrition of the infant from any cause, and in this connexion the two chief factors usually concerned are the body weight and growth, but in the case of the infant we are perhaps inclined rather to disregard the growth or length, and to focus our attention on the weight of the child. Therefore we meet to-day to consider those conditions which cause failure to gain weight, or in some cases cause actual loss of weight in infancy. In most cases the child is born healthy, and its subsequent failure to develop along normal lines may be due to a variety of causes, of which the most important appear to come under the following headings:

1. *Dietetic Errors:*
   (*a*) Food unsuitable in quantity or quality, or both.
   (*b*) Mismanagement of the way in which the food is given to the child.
   (*c*) Disability of the child to take the food given to it.
2. *Infection:*
   (*a*) Gastro-intestinal.
   (*b*) Parenteral.
3. *Environment:*
   Bad hygiene, including poor social conditions and lack of "mothercraft."
4. *Constitutional Causes:*
   (*a*) Congenital disease.
   (*b*) Exudative or other diatheses.
   (*c*) Neuropathic defects.
5. *Birth Injuries.*
6. *Prematurity.*
7. *Marasmus or "Infantile Atrophy."*
   (Since marasmus *per se* does not appear to fall strictly under the above headings I have classed this by itself for special consideration.)

Time does not permit of dealing in any detail with all the different types of cases which occur under the headings that I have suggested, but perhaps I may be permitted to refer very briefly to some of them.

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Dietetic Errors

From a general point of view failure to thrive is due to a lack of proper co-ordination between the nature of the food and the ability of the child to digest and assimilate it. The degree of ability or disability of the child to receive and digest its food has been referred to by Finkelstein as the "food tolerance," which varies according to the individual digestive capacity of the child. Dietetic errors, either in quantity or quality, are the most common cause of digestive disturbances, which may lead to varying degrees of malnutrition.

Most healthy infants have a wide digestive margin, and appear to be able to escape injury even when given feeding mixtures which might be considered unsuitable. Each infant has its own limitations in respect of its tolerance for unsuitable food, but when this is pushed too far, digestive disturbances are liable to arise resulting in varying degrees of nutritional deficiency.

I think most of you will agree that nutritional defects are much less common in the breast-fed baby, but you will also admit that difficulties and failures resulting in wasting conditions of the child occur far too frequently with this type of case. It is in the bottle-fed child, or the child who has been weaned too soon from the breast, that "wasting" or nutritional defects are most commonly found. I have had the advantage of seeing large numbers of these two classes of cases over a considerable period, and it may be of interest if I give you a few statistics taken from the records of the Mothercraft Society of cases admitted and treated there during the past five years. I have picked out the infants who showed the most excessive malnutrition, and have arranged them in the two following groups:

GROUP I: BREAST-FED

Apparent Causes of Wasting

Underfeeding ...	31	
Early weaning ...	13	
Overfeeding	5	
Condition of breasts	4	(deformities of nipple)
Condition of mother	1	(severe post-partum haemorrhage)
Condition of baby...	1	(difficulty in sucking)
High-fat milk ...	3	
Total... ...	58	

GROUP II: BOTTLE-FED

Apparent Causes of Wasting

Early weaning and wrong feeding	122
Never breast-fed and wrong feeding	20
Over- or under-feeding	3
Rumination	1
Baby's condition at birth	1
Infectious disease	1
Baby (mental defect)...	2
Congenital heart	1
Eczema	1
Total	152

(Fifty-six of these infants were given breast milk from a foster-mother.)

Analysis of the Two Groups

	Group I: *Breast-fed*	Group II: *Bottle-fed*
Number of cases	58	152
Average age on admission ...	5.3 weeks	3.6 months
Average weight on admission	6 lb.	8 lb.
Average stay in hospital ...	32.3 days	82.3 days
Shortest stay in hospital ...	5 ,,	21 ,,
Longest stay in hospital ...	85 ,,	189 ,,
Mortality	*Nil*	6.5 per cent.

A comparison of the figures in these two groups of cases brings out certain facts. In the breast-fed group the number of severe malnutrition cases is much smaller, the average stay in hospital is much shorter, and the mortality is *nil*. The chief difficulty in this group was an insufficient amount of breast milk. In the bottle-fed group the total number is much larger, the average stay in hospital is very much longer, and the mortality rate is 6.5 per cent. By far the most common cause of the trouble was early weaning followed by unsuitable feeding.

Speaking generally, with regard to the breast-fed infant probably over-feeding is the most common mistake made, at least that is so in my experience, but this is seldom the cause of severe malnutrition, and the amount of the feeds can be readily adjusted. In the case of under-feeding it is rather surprising to note how many mothers are slow to realize that when the baby fails to thrive on the breast it is due to a deficiency in the amount of the milk. The value of accurate test-weighing cannot be overestimated when it is necessary to ascertain the amount of breast milk taken by the child.

Unsuitability of Breast Milk?

Although breast milk is undoubtedly unsuitable in some cases, it is unusual. The quality of the milk is blamed when the real trouble is due to its quantity or the way in which it is given. Analyses of breast milk prove that its composition is extraordinarily stable, and if any of its constituents vary the one most likely to do so is the fat. The fat may be raised to 6 or 7 per cent., and when this is the case it is liable to cause considerable upset in the child. The excess of fat in the mother's milk does not appear to have any direct relation to her diet, but an increased amount of physical exercise may help to reduce it in some cases. Conditions of the breast such as deformities, or soreness of the nipples, breast abscess, etc., are all responsible for premature weaning.

I think it may be fairly said that most of the failures to breast-feed, and the consequent nutritional defects in the child, are due to mismanagement, and are preventable if a proper technique is adopted. The mother very often has no experience, and is sometimes dissuaded from feeding her child when instinctively she is most anxious to do so. There are very few occasions when advice against breast-feeding is really justified, and it is quite evident that the number of cases of infantile malnutrition will continue to diminish as breast-feeding is increased.

Ante-natal preparation with regard to the future care and feeding of the child is of the utmost value. I think more might be done in this direction by the ante-natal clinics. The diet during pregnancy is a matter which seems rather to be neglected. After the arrival of the baby the maternity nurse must get breast-feeding properly established, and later the main function of an infant welfare centre should be to keep the child on the breast. The mother turns to her doctor or her nurse to instruct her in proper methods, and a knowledge of these methods must be acquired. Most of the medical schools and maternity hospitals now give special attention to the teaching of breast-feeding, and this should have an important effect in the future on the nutrition of the child.

One most striking thing is the satisfaction in the state of the mother who has been able to re-establish breast-feeding satisfactorily after having weaned her child, often much to its disadvantage. With the difficulties which may occur in connexion with breast-feeding I have no time to deal, but I do wish to stress the fact that the lack of it is one of the most important causes of faulty nutrition, and very often of wasting in the child.

The Bottle-fed Child

Referring to the particulars of the severely wasted infants in the list to which I have referred, the chief cause of the malnutrition was unsuitable food, either given from birth or after weaning from the breast. In many cases a number of different foods had been used one after another, sometimes with temporary success and then further loss in weight. Wrongly balanced diets, and foods too much or too little in quantity for the caloric needs, were often used. Excess of fat, or an intolerance for fat, is a fairly common difficulty with the bottle-fed child, and when fat has to be much reduced or omitted from the feeds the caloric value drops considerably unless it is made up for by increased sugar or protein.

The views on the artificial feeding of the infant are varied, but I think that most people will agree that a properly balanced diet is necessary, that it should approximate the human standard, and that the caloric value of the food should be adequate to meet the child's requirements. I have seen many cases where a simple correction of the diet which is already being given to meet these standards has terminated the digestive difficulty. The subject of the amount of protein in the child's diet is one which interests me, and the tendency nowadays is to give milk mixtures which yield a much higher amount of protein than is present in breast milk. The optimum amount of cow's milk protein for the normal child is not certain, but at any rate in my own experience for the first six months a percentage of 1.6—that is, half-strength cow's milk—otherwise properly modified by the addition of sugar and fat, appears to give perfectly satisfactory results as judged by the child's state of nutrition, provided, of course, that a sufficient total is given.

The re-education of the child's digestive system after a severe upset may take a considerable time, and it is impossible to force food on it even when recourse is had to the use of breast milk from a foster-mother. In the case of the wasted child the aim should be to feed it up to the expected weight, and this means giving a larger number of calories for each pound of body weight than in the case of the normal child. The difficulty now arises in getting the child to deal with the amount of food which it really needs, and in such cases highly concentrated milk mixtures yielding small bulk are sometimes successfully used when the child can manage to digest and absorb them, but I have come across many cases where this is not possible, and the giving of the concentrated food simply aggravates the intestinal irritation. On the other hand, I have seen many successful cases in which it has been necessary to start the child on small low-calorie feeds, working gradually up to its maximum point of absorption. It is better to give a small amount of food which is absorbed than to give large amounts which are not made use of and sometimes tend to aggravate the condition. It is again all a question of tolerance of the child, and in some cases high-calorie feeds are of benefit, in others not so. For the child who has simply been starved the stronger feeds are certainly indicated, and are usually well tolerated. While on the question of calorie requirements it is of interest to note that the breast-fed child will sometimes gain excessively in weight in spite of the fact that it is receiving an amount of milk of much lower calorie value than its age and weight demand. Disability on the part of the child to take food may be due to local conditions of the mouth, nasal obstruction, nervous excitability, or to general weakness.

These call for appropriate treatment, otherwise the child who is difficult at the breast or bottle can usually be persuaded by an experienced nurse.

Infection and Environment

Gastro-intestinal infection may be conveyed by milk or by dirty bottles, teats, or "dummies"; stomatitis may give rise to an intestinal infection, therefore the mouth should always be examined. Gastro-enteritis due to any specific organism rarely occurs in infancy, and bacteriological investigation of the stools seldom yields any useful results. "Epidemic diarrhoea" has very much diminished of late in this country.

Parenteral infections, particularly middle-ear or mastoid disease, pyelitis, or pneumonic infections are sometimes associated with acute gastro-enteritis; these infections may be primary to, or the result of, the intestinal conditions. It is important to examine carefully every child who is suffering from prolonged wasting for possible infections of this type.

Among the children of the poor, perhaps lack of fresh air and bad housing conditions are more frequent than lack of food. Lack of mothercraft is also important, but the infant welfare movement and better social conditions of life are doing much to remedy these causes of malnutrition.

Constitutional Causes, Birth Injuries, and Prematurity

Congenital disease—that is, congenital syphilis, heart disease and neuropathic defects—and tuberculous infection (usually acquired) form a comparatively small group, and must be dealt with according to the special circumstances of the case. Intracranial and facial nerve injuries may cause malnutrition by interference with the sucking mechanism of the child.

The premature baby, although being under weight as compared with the normal child, does not necessarily suffer from malnutrition, but this condition is more likely to arise in the premature child owing to the enfeebled state of its digestive system. Hence special precautions must be taken in the feeding and management of the premature infant to guard it against wasting conditions.

Marasmus

The term "marasmus" is perhaps used somewhat loosely to apply to any case of prolonged and excessive wasting in infancy. Personally I regard the special feature of marasmus as being the wasted condition which results essentially from more or less complete non-absorption of food for no very obvious reason. This failure to absorb persists for some time, even when food is given in the most easily digestible form. The marasmic child wastes progressively, passes large undigested stools, and its general state of vitality is considerably lowered, rendering it liable to infections. Marasmus is seldom seen in the breast-fed child, which suggests that the kind of food is an important factor. Many marasmic infants can only be saved by suppiying them with breast milk, and it is not always easy to get it. We have an organized service of blood donors under the Red Cross; it is to be regretted that we cannot have some form of organized service for the supply of breast milk in this country, as obtains, I believe, in America.

Any of the causes to which I have referred may be contributory factors in the marasmic state, and when it occurs it sooner or later leads to a state of dehydration followed by toxaemia. Moro regards the dehydration as the result of, and not as the cause of, the intoxication. Other workers think it may be due to the presence of bacteria and their toxins in the bowel owing to abnormal conditions. Marriott refers to diminished blood volume and blood flow in the tissues in severe nutritional disturbances. Whatever may be the cause or causes of marasmus, it is very evident that the toxic condition and dehydration call for very urgent treatment. The mere replacement of tissue fluids by the simple method of subcutaneous injection of a solution of saline and glucose is often the means of saving a child's life.

Blood transfusion also appears to have beneficial effect, but this may be a difficult or even impossible procedure in the case of a wasted infant except by one who is specially practised in it. I have lately been trying the effect of giving intramuscular injections of whole blood, 20 to 40 c.cm., in some of these marasmic infants, particularly when toxaemia seemed to be a marked feature. So far the results are encouraging, since without any alteration in the feeding or management, the child has taken a turn for the better after receiving the blood. This method has the advantage of being exceedingly simple; no blood grouping is necessary, and no adverse reactions occur. It would be necessary to treat a number of cases in this manner before one could say that it had any definite result, but I feel that it is worth further trial.

Of the many other methods employed in the treatment of the marasmic child I have no time to speak, but in reference to the kind of food when breast milk is not available, lactic acid milk with a high protein and sugar content and low fat appears to be one of the most useful substitutes.

Conclusion

Viewing it from its narrowest limits, "wasting" in infancy appears to be due to two main causes: (1) errors of diet; (2) pathological conditions—that is, infection or disease. In opening this discussion I am fully aware of my shortcomings, but I hope I have succeeded in throwing out a few general suggestions which may encourage others to express their opinions on this very important subject.

O. L. Lien (*Tidsskr. f. d. Norske Laegefor.*, May 11th, p. 540) gives an account of investigations conducted among school children in a rural community in Norway. In the spring of 1935 as many as 502 out of 551 children examined were found to have one or more carious teeth. There were twenty-three with stopped teeth, and only twenty-six, or 4.7 per cent. of the total, with apparently healthy teeth. After noting that similar investigations in other parts of Norway have yielded even worse results, the author summarizes the findings of a dietetic questionary he addressed to 600 school children in the autumn of 1935. Of the 592 who replied thirty-four stated that they did not drink milk and forty-seven that they drank it only when they could get it. In other words, about 14 per cent. were practically without milk. On the other hand, there were as many as 381 (64 per cent.) who were in the habit of drinking coffee. With Norway heading the nations as the greatest consumer of coffee (seven kilos per head per year) and as the most afflicted by caries, the author suggests that these two unenviable championships are related to each other, and that addiction to coffee in childhood implies weaning from milk. As great a proportion as 63 per cent. of the children questioned ate bread of finely sifted flour or some nameless substitute for whole-meal bread. The author concludes with an appreciative reference to the educative value (for the recipients as well as for the emissaries) of dietetic questionaries, and he suggests that were his example to be followed throughout the country a valuable impetus would be given to parents to indulge in some searching of heart for the benefit of their offspring.

TUBERCULOSIS IN INFANCY AND CHILDHOOD:

WITH SPECIAL REFERENCE TO ITS PREVENTION *

BY

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In the child as compared with the adult the uncomplicated character of disease makes it easier to find the initial lesion, to follow its course, to interpret the pathological changes, and thus often to assess the aetiological factor. This is true of many diseases in childhood—for example, nephritis, rheumatism, pulmonary and intestinal diseases, and, in particular, tuberculosis, in which the initial infection occurs nearly always on a virgin soil. Thus the lesion produced is not affected by the allergy or immunity caused by previous tuberculous disease. Further, the child's organs—lungs, intestines, and lymphoid tissue—unlike those of the adult, have not undergone morbid anatomical change as a result of more or less severe non-specific inflammatory conditions which may influence the progress and the results of tuberculous infection.

General Incidence and Mortality

I have investigated 434 cases with tuberculous lesions found in a series of 3,000 necropsies during the last twelve years at the Royal Hospital for Sick Children, Glasgow. Some of the results have already been reported,[1 2] and in this paper these earlier results are included with later observations. It is evident from Table I that the incidence of tuberculous lesions is exceptionally low in the first three months of life, but thereafter gradually rises to its peak in the third year, after which there is a slight fall. The incidence of lesions recorded here is lower than that found by most Continental workers—for example, by Comby[3] in Paris, whose total percentage in children up to 15 was 36.7, and by Hamburger[4] in Vienna, with 39.5 per cent. Combe,[5] in 25,000 collected necropsies, found an average incidence of 8.7 per cent. for the first year of life, which is a little higher than mine.

TABLE I.—*Incidence of Cases with Tuberculous Lesions in 3,000 Necropsies; Incidence of Positive Mantoux Tests in Clinical Series.*

Age Group	Total Necropsies	Cases with Tuberculous Lesion: Number	Cases with Tuberculous Lesion: Per Cent. of Total Necropsies	Cases with Tuberculous Lesion: Per Cent. Dying of Tuberculosis	Tuberculin Series. Adjusted Per Cent. Positive 1 in 10 O. T.
-3 months	971	7	0.72	100.0	0.0
-6 „	536	40	7.46	100.0	5.0
-9 „	325	45	13.85	97.8	6.0
-12 „	223	40	17.90	95.0	6.0
-18 „	215	57	26.50	96.5	11.0
-2 years	140	38	27.10	94.7	18.0
-3 „	145	62	42.8	93.5	28.0
-6 „	228	80	35.1	75.0	30.9
-9 „	153	43	28.1	76.7	47.8
-13 „	64	22	34.4	72.7	63.8
Total ...	3,000	434	14.5	89.2	—

I have never felt that the post-mortem index of infection was a true one in the higher age groups, in which the numbers are rather small and in which other factors noted below may be at work. Of course it might be objected that in my series small tuberculous lesions were missed, but this is unlikely, since I failed to find a sensitizing lesion in only thirty-six cases reacting positively to tuberculin out of 2,163 cases carefully Pirquet or Mantoux tested. Of these thirty-six cases twenty-five were in the first two years of life.

In order to find in another way the incidence of infection, Griffin and myself performed a series of Mantoux tests in nearly 2,000 children at the Royal Hospital for Sick Children, Glasgow, during 1932–4—that is, in the latter years during which the post-mortem observations were made. The strength of the old tuberculin used varied from 1 in 1,000 to 1 in 10 as recommended by Hart,[6] and the incidence of positive reactions was calculated as an "adjusted percentage" to the 1 in 10 dilution. A detailed account of this series will be published later, but they are summarized in Table I, which shows that in the first three years the percentage of positive reactions is below that of tuberculous lesions found post mortem, probably because some of the younger subjects with severe tuberculosis did not react to the higher dilutions and died before greater concentrations could be used. The incidence of positive tuberculin reactions and positive necropsy findings is much the same for the 3 to 6 year group, but thereafter the percentage of positive tuberculin tests rises to almost double that of the positive necropsy findings.

The mortality from these tuberculous lesions gradually decreases *pari passu* with the age of the child (Table I). Thus the older child is better able to arrest a tuberculous infection. The higher level of mortality to the incidence of infection as shown by the Mantoux test during the first three years of life indicates the serious prognosis of infection at this period. Comparison of the post-mortem findings and results of Mantoux tests, however, shows that the former underestimates the frequency of infection from the sixth year onwards, probably on account of the smaller numbers of older children and also as they are usually affected by more chronic and localized types of tuberculosis many cases do not find their way to a general children's hospital, but are sent direct to special tuberculosis hospitals. It is evident, however, from Table I, that the mortality even in the higher age groups is considerable. The ratio of mortality from tuberculosis to that from all diseases recorded by the Registrar-Generals for Scotland or England is, however, lower for all age groups than those described here. The mortality rate in relation to the morbidity rate varies greatly with the geographical distribution, and my mortality expressed as a percentage of the incidence of the tuberculous lesions is higher than that reported by foreign workers—for example:

	Months			Years					Total
	-3	-6	-12	-2	-5	-7	-11	-14	
Hamburger[4] (Vienna, 1903-6; 848 necropsies)	100	100	80	70	67	60	68	50	69
	83.8								
Blacklock (Glasgow, 1924-36; 3,000 necropsies)	100	100	95.5	95.8	81.7	69.0	80.0	57.1	89.2
	97.7								

Nassau and Zweig[7] in Berlin found a 69.3 per cent. mortality in the first year; Mantoux[8] in Paris 75 per cent. for the first six months of life, 54 per cent. for the second, 40 per cent. for the third, and 28 per cent. for the fourth. In the United States Drolet[9] estimated the annual mortality of infected infants at 1.3 per cent., while Asserson,[10] in a five-year follow-up of 405 infected infants under two years, found a 51.7 per cent. mortality. In this country, then, the mortality in relation to the

* Read in opening a discussion in the Section of Pathology and Bacteriology at the Annual Meeting of the British Medical Association, Oxford, 1936.

morbidity rate is higher than abroad, and while reasons for this are easily suggested yet they are difficult to prove. It is possible that in Scotland—and this also applies to Ireland and Wales—racial factors may be at work. The Celtic race is probably less resistant to infection than the Germanic on account of its more isolated geographical position, at least in the past. Thus the contact of the former with tuberculous infection has been probably shorter, resulting in lower racial immunity. The easier means of transport of our own time, however, is likely to change this. Dietetic factors, too, may play a part, while our variable and comparatively sunless climate must also lower resistance to infection partly by confining children indoors, thus bringing them more into intimate contact with any familial tuberculous infection. This would result in a more frequent dosage with tubercle bacilli which is commonly productive of a progressive and generally fatal tuberculosis in childhood. It is also possible that the strains of tubercle bacilli causing infection here are more virulent than those found abroad; proof of this, however, is lacking.

Sex Incidence

In this series girls were more frequently affected than boys at all ages (Table II). In the Registrar-Generals'

Table II.—*The Sex Incidence of Tuberculous Lesions in 3,000 Necropsies*

		-1 Year	-2 Years	-3 Years	-6 Years	-9 ears	-13 Years	Total
Boys	Total necropsies	1,275	209	82	118	88	41	1,813
	Per cent. tuberculous	6.04	23.9	40.2	23.7	23.9	34.1	12.3
Girls	Total necropsies	780	146	63	110	65	23	1,187
	Per cent. tuberculous	7.05	30.8	46.0	47.3	33.8	34.8	17.7

reports this greater incidence in the female sex is also apparent from the fourth to the thirtieth years. The difference which I have found in the first four years of life probably depends on the greater mortality from all causes in boys, whereas thereafter the mortality rate from all causes is nearly equal in both sexes. The difference in the sex mortality from tuberculosis in older children would appear to be of some significance, and probably depends on the fact that in working-class homes at least girls are more domesticated than boys, and are thus more frequently exposed to any familial tuberculous infection. Dow and Lloyd[11] have observed in London that the incidence of positive Mantoux tests is slightly higher in girls than in boys, while Armand-Delille *et al*[12] have also noted that from the ninth year onwards pulmonary tuberculosis is commoner in girls in Paris. It is thus possible, then, for child-welfare workers to do something to lower this higher incidence in girls.

The Immunity from Childhood Infection

A benign childhood tuberculous infection has generally been regarded as producing some immunity to such infection in later life. It seems certain, however, from my figures that tuberculous infection in the child under 3 years is serious, and should, if possible, be prevented. The effect of these childhood lesions on later infection is imperfectly understood. Experimental work in animals has given very divergent results.[13 14 15] Further, the reaction in already infected animals to a second infection is possibly quite different from that in man. Thus observations on the human subject are more likely to yield satisfactory results regarding the alleged immunity to infection in later life produced by childhood lesions, though here again confusion exists. For example, the South African Rand report[16] states that tuberculin-positive negroes are more likely to develop a recognizable tuberculosis than tuberculin-negative reactors, but the latter show a greater liability to develop a septicaemic type. Stewart[17 18] and Myers and Harrington[19] observed that tuberculin-positive children more frequently develop fatal phthisis in later life than those who react negatively; De Besche and Jörgensen[20] have also made somewhat similar observations in adults. On the other hand, as suggested by Wingfield,[21] a high degree of immunity should nullify the danger of a high degree of allergy.

From my own morbid anatomical observations the effect of allergy as a result of infection occurring later in childhood is very different from that acquired in infancy. For example, in the older child, as described later, there are less extensive and better encapsulated secondary lymphatic lesions in relation to the primary infection and less frequent generalization. This difference is due, first, to the fact that the younger the child the more intimate and more frequent the exposure to any familial infection; secondly—and here we are on uncertain ground—to the higher natural immunity to any type of infection in older children. In my opinion it is those late childhood minimal infections which, becoming quiescent, give rise to some degree of immunity that prevent these acute types of tuberculosis reported by Borrel[22] in native troops brought to Europe. Nassau and Zweig[7] have observed that tuberculosis contracted after the second year generally remains latent and prevents later severe infections. It is long since Marfan[23] confirmed the original observations of Bazin and Cornil that pulmonary tuberculosis was relatively uncommon in those with tuberculous cervical adenitis or lupus, and that when pulmonary lesions did occur in such subjects they ran a relatively benign course. The balance of evidence is thus in favour of the view that minimal infection in later childhood probably affords some degree of protection against reinfection with small and infrequent doses of tubercle bacilli. Further, it would seem to me that allergy in the human subject is but a step in the development of immunity, which in most people increases, while allergy usually decreases. It must not be assumed, however, that this immunity is as absolute as that following many of the virus or bacterial infections; it is rather an imperfect immunity, which can be broken down by ill-health or by massive or continuous infection with tubercle bacilli either of exogenous or endogenous origin.

In an attempt to imitate the immunity resulting from infection the use of B.C.G. vaccine has been recommended by Calmette. While it may be desirable to adopt this measure in infants who are exposed to virulent infection in their homes, from which neither they nor the source of infection can be removed, yet the indiscriminate application of this vaccine to the child population as a whole would seem a questionable procedure, even in spite of the fact that favourable reports of its efficacy have been published.[24 25 26] It should be remembered, too, that the immunity so produced lasts only a year or two. Further, it has never been satisfactorily explained what may happen in time to this B.C.G. bacillus, which, according to its discoverers, is of bovine origin and innocuous to the human subject. We know that it is capable of surviving in the human body—a tissue quite unlike the glycerol-bile-potato medium used to maintain its avirulent character. After many years' sojourn in the tissues it may mutate to a more pathogenic form or even to a human type. While mutation to a different type has not yet been proved in the case of tubercle bacilli, yet it is stated to occur with other groups of bacilli. Calmette[27] himself thought it possible that in naturally occurring bovine infections in man mutation to the human type after a time was possible, and might be the cause of pulmonary tuberculosis. On the other hand, the possibility of producing immunity with killed cultures of tubercle bacilli has none of these objections, and as such

cultures have been shown to produce a certain degree of immunity in animals[28] the experiments of Goodwin and Schwentker[29] with such material in children will be followed with interest. These immunizing vaccinations, however, produce a specific allergy in the infant, a factor considered as unfavourable by some.[17 18 19] According to Heimbeck,[24] unless allergy as shown by a positive tuberculin reaction is produced after inoculation with B.C.G., protection against infection is inadequate.

Primary Respiratory Tuberculosis

A consideration of the pathway of infection is most helpful so far as prevention is concerned. There are five possible routes of infection, three—namely, by the skin, eyes, and genital organs—being of little general importance. The main routes of infection are the respiratory and alimentary systems. The former is the more frequent, occurring in 283* (65.2 per cent.) of the 434 cases studied.

The lesion produced at the portal of entry in the lung, as I have fully described already,[1] is characteristic, consisting of a small localized patch of caseous bronchopneumonia which, in most instances, is about the size of a pea. This type of lesion can occur only in the non-allergic individual and is thus most frequently seen in children, but may be found occasionally in adults from isolated localities. Such primary lung lesions are often wrongly called Ghon's focus, since Parrot[30] described them fully forty years before Ghon. In 255 of the present series of 283 respiratory cases typical primary lesions were found ; in the remaining twenty-eight cases, to be described later, no such lesions were observed. In our experience, as well as that of others,[12 31 32] these lesions are usually subpleural, and are most frequently found in the right upper lobe. Others[33 34] have found that the right lower lobe was most often affected, and according to Lange[35] the left upper lobe. From the lung lesion the infection rapidly passes to the tracheo-bronchial glands. In all our cases these glands were affected, and this is the rule, the size of the glandular lesion often being in marked contrast to the small primary lung lesion. The larger size of the glandular lesion depends probably on the fact that a degree of allergy causing an increased inflammatory reaction has been established while the glandular lesions are developing. Thus the important thing to recognize is that this small primary lesion—generally imperceptible either in *x*-ray plates or by physical examination—causes the marked hilum tuberculosis which is usually recognizable radiologically. It must not be assumed, however, that all hilum shadows are necessarily tuberculous. These hilum glands are the largest in the child's body, and respond rapidly to any inflammatory condition in the lung, and, in the absence of a reliable positive tuberculin reaction, such shadows are certainly not tuberculous. In most of our cases only one focus was found, and this is the common experience, though as many as seventeen have been observed in one child.[36] In my 255 cases 231 had but one focus, while in the remaining twenty-four more than one was present, the total for the whole group numbering 290. The smaller type of foci—pea-sized—was the commonest, though larger ones were sometimes found. Small tubercles due to lymphatic spread and areas of epituberculosis around such primary lesions were frequent. From the prophylactic point of view the incidence of healing in these primary foci at various ages is important ; in the 290 foci there was naked-eye evidence of healing as follows:

0– 6 months	40 foci	none showed healing	
6–12 ,,	58 ,,	10.3%	,, ,,
1– 2 years	62 ,,	37.1%	,, ,,
2– 3 ,,	40 ,,	40.0%	,, ,,
3– 6 ,,	44 ,,	52.2%	,, ,,
6–13 ,,	46 ,,	67.4%	,, ,,

* In five of the cases there were double primary sites of infection—one in the respiratory and the other in the alimentary system.

Calcification was rare, however, occurring in only twenty-six foci (8.97 per cent.), twenty-two of which were in children over 3 years of age. It is apparent, then, that the older the child the greater the incidence of healing of these primary lesions, a fact which indicates that the longer infection is delayed the greater is the chance of healing. Further, in older children the glandular disease is less extensive and more chronic. In nearly all the cases (212 out of 255) with typical primary lung foci other secondary lesions—acute and subacute miliary tubercles, areas of bronchopneumonic tuberculosis—were present in the lungs. The extent and the severity of these secondary lesions varied greatly in different cases, but were always more severe in the younger children.

In twenty-eight cases no typical primary lung lesion was found, though in all the tracheo-bronchial glands were enlarged and caseous, and the morbid anatomical evidence clearly pointed to a respiratory portal of entry. Most of these cases have already been fully described,[1] the only additional point being that the occurrence of the typical adult apical chronic peribronchial tuberculosis was found in children only from the ninth year onward. Leroux[37] has also observed the occasional presence of chronic apical tuberculosis in older children.

It would appear to us from an extensive morbid anatomical study of these cases that it is the glandular lesions which are largely responsible for the secondary and often fatal mischief. Not only do the tracheo-bronchial glands drain into the main lymphatic trunks, but frequently their efferents run directly into the great veins of the thorax, thus allowing rapid and early generalization. Table III shows that dissemination of the infection

Table III.—*Causes of Death in* (a) *Primary Respiratory Tuberculosis,* (b) *Primary Abdominal Tuberculosis*

Cause of Death	Respiratory Tuberculosis		Abdominal Tuberculosis	
	-3 Years	-13 Years	-3 Years	-13 Years
Tuberculous meningitis and or generalized miliary tuberculosis	184 (96.8)	79 (85.0)	68 (73.1)	14 (29.8)
Lung disease	5 (2.6)	4 (4.3)	—	—
Tuberculous peritonitis	—	—	13 (14.0)	5 (10.6)
Intestinal ulceration	—	—	—	1 (2.1)
Not cause of death	1 (0.5)	10 (10.7)	12 (12.9)	27 (57.4)
Total	190	93	93	47

(Percentages in parenthesis)

(meningitis, miliary tuberculosis, or both) was commoner in children under 3, in whom glandular involvement was greater, than in older children. In these younger children the lung lesion was directly or indirectly the cause of death in 99.5 per cent. ; in children over 3 years this percentage was 89.3. Findlay[38] and McNeil[39] have also noted clinically the fatal nature of pulmonary tuberculosis in young children in Glasgow and Edinburgh respectively. Even in older children, however, the finding of a healed primary lung lesion at necropsy in a general children's hospital is infrequent, and also in adult necropsies in Glasgow healed infantile lesions are rare.

TYPES OF BACILLI PRESENT

So far I have isolated and typed 166 strains of tubercle bacilli from cases of primary respiratory tuberculosis. The age and type distribution of these strains is shown in Table IV, from which it is seen that the human bacillus was chiefly responsible for the infection (96.4 per cent.) while in only six (3.6 per cent.) of 166 cases were bovine strains found. Lange[40] noted 4 per cent. bovine infection (two out of fifty) in children under 16 in Berlin. The explanation of the probable human origin of these bovine

strains in respiratory lesions has already been fully explained.[1 41] From these findings it is evident that the infection is derived from human sources, and most often from some person suffering from phthisis with whom the child is frequently in close contact. Chown and Medovy[42] found in Canada that 95 per cent. of tuberculous infants were infected from adults with whom they were closely associated. The prevention of the *continuous* exposure to infection is one of the most important measures in the control of infantile tuberculosis. In France the isolation of the infant from familial infection under the Grancher system has been most successful according to Armand-Delille,[43] who found that of 1,500 children thus isolated only seven developed tuberculosis, whereas 60 per cent. of those remaining with their tuberculous families became infected, 40 per cent. dying of the disease. By such segregation it is possible to prevent infection at the time when the child is most susceptible. There is, however, I feel, a very real danger of interfering too much with nature by delaying unduly the naturally occurring contact with tuberculous infection—for example, till puberty—when children, particularly girls, are subject to additional bodily stress and strain, which must have an adverse temporary effect on the general resistance to disease. Further, in this connexion it should be remembered that the mortality from tuberculosis is very low between the ages of 5 and puberty. The other preventive measure available is vaccination, and this has been discussed above.

TABLE IV.—*Types, Age Distribution, and Source of Bacilli Isolated from Children*

Primary Lesion	Type of Bacilli	-1 Year	-2 Years	-3 Years	-6 Years	-9 Years	-13 Years	Total
Respiratory	Human	58	31	21	24	19	7	16
	Bovine	1	2	2	1	–	–	6 (3.6%)
Abdominal	Human	3	5	1	3	1	–	13
	Bovine	16	18	8	10	5	3	60 (82.2%)
Cervical	Human	1	1	2	3	4	–	11
	Bovine	4	2	–	3	5	5	19 (63.3%)
Bovine per cent. ...		25.3	37.3	29.4	31.8	29.4	53.3	31.6

Primary Alimentary Tuberculosis

In 149 (34.3 per cent.) of the 434 tuberculous cases investigated the portal of entry was in the alimentary system ; 140 (32.3 per cent.) in the bowel, and nine (2.07 per cent.) in the cervical glands ; in seven cases the portal of entry could not be discovered. Our figures for the intestinal, and to a less extent the pharyngeal (cervical) route of infection, are higher than those recorded by Continental workers ; for example, Ghon and Kudlich[44] found of 2,114 cases of tuberculosis in children in Central Europe only twenty-four (1.14 per cent.) with a primary intestinal infection and two (0.09 per cent.) in the tonsil.

PRIMARY ABDOMINAL TUBERCULOSIS

Intestinal tuberculous ulcers with caseous mesenteric glands were found in twenty-four of the 140 abdominal cases ; in the remaining 116 no ulcers were observed, but the mesenteric glands were tuberculous. The former was found chiefly in the first three years of life (twenty of twenty-four cases) and always proved fatal. The incidence of healing of the lesions in the mesenteric glands was higher in older children, and corresponded with that already described in the primary respiratory infection. Of the 140 cases 45 per cent. were country children, as compared with 15.5 per cent. with a primary lung infection. Only nine of sixty-nine cases occurring in the first two years of life had been breast-fed ; fifty-seven had been bottle-fed or partly bottle-fed and breast-fed, and in three the type of feeding was unknown. Thus in the breast-fed child abdominal tuberculosis was much less frequent.

On considering the end-results of these infections death was due in eighty-one (87.1 per cent.) of the ninety-three children under 3 years to generalization of the disease—miliary tuberculosis, tuberculous meningitis, or both—or tuberculous peritonitis, while in only twelve (12.9 per cent.) children was the lesion found accidentally post mortem (Table III). A very different result was obtained in children over 3 years, of whom only fourteen of forty-seven (29.8 per cent.) died of generalization and six of tuberculous peritonitis or intestinal ulceration ; in twenty-seven (57.4 per cent.) the lesion was an accidental finding post mortem (Table III). Thus the total mortality of primary abdominal lesions was 101 of 140 (72.1 per cent.) as compared with 272 of 283 (96.1 per cent.) in the primary thoracic group. In both series the mortality rate was less in children over 3 years.

Type of Bacillary Infection.—From cases of primary abdominal tuberculosis seventy-three strains were obtained. Of these, sixty (82.2 per cent.) were bovine and thirteen human. The bovine percentage is very much higher than that found by Continental or American workers, Lange's[40] recent figure for Berlin children under 16 being 41 per cent. The greatest percentage of bovine strains in any one year of life occurred in the second—that is, at a time when the child is consuming large amounts of milk (Table IV). The high percentage (82.2) of bovine strains in abdominal tuberculosis points clearly to infection from milk. Of twenty-six country children twenty-three (88.5 per cent.) were infected with bovine strains as compared with thirty-seven (78.7 per cent.) of forty-seven Glasgow children. Thus, besides a high incidence of abdominal tuberculosis in the country child, there is also an increased bovine percentage as compared with the town child. The reason for this is obvious when it is realized that the city child is better protected from bovine infection on account of the extensive pasteurization of milk in cities (80 to 90 per cent. in Glasgow). Further, in the first year of life breast-fed infants are less frequently infected by bovine strains than bottle-fed, no bovine infections and one human being found in the former, and sixteen bovine and two human in the latter.

PRIMARY TUBERCULOUS CERVICAL ADENITIS

Only nine (2.07 per cent.) of the 434 coming to necropsy had the portal of entry in the pharynx, with secondary tuberculous cervical adenitis, thus testifying to the relative benignity of this common type of tuberculosis. In seven of the nine cases death was due to tuberculous meningitis or generalized miliary tuberculosis, or both ; in the other two the cervical lesion was found accidentally post mortem. Of thirty strains from various cases of cervical gland tuberculosis six were obtained from necropsy material and twenty-four from surgical cases. Of these, eleven were human and nineteen (63.3 per cent.) bovine. Again, as in abdominal tuberculosis, the percentage of bovine strains is higher than that recorded by foreign workers. Also the bovine percentage is higher in country (five human, seventeen (77.3 per cent.) bovine) than in Glasgow children (six human, two (25 per cent.) bovine). Thus a milk-borne infection is indicated in the majority of children.

Prevention of alimentary infection depends on the freedom from tubercle bacilli of the milk supply, and thus alimentary tuberculosis is much easier to control than respiratory infection. Unfortunately, infection with the bovine bacillus accounts for a very small proportion of the total tuberculosis mortality (estimated at 5.27 per cent. for all ages and at 25.27 per cent. for children under 15 by the People's League of Health report).[45] In the case of infants every healthy mother should, if possible,

breast-feed her child. Where this is impossible then a tubercle-free milk—certified or pasteurized—should be used, and if this is not obtainable, boiled milk, which, I am assured by experienced paediatricians, is very suitable for the infant.

In populous centres tubercle-free milk is available and even insisted upon by legislative procedure. On the other hand, the higher incidence of bovine infection in rural districts shown by the present figures and those of others[46 47] suggests a greater contamination with live tubercle bacilli in country than in town milk. Efficient pasteurization of milk is a cheap and effective method of dealing with tuberculous and other infections—for example, typhoid, dysentery, diphtheria, and scarlet fever, etc. Price[48] in Toronto has shown the practical disappearance of bovine infections following pasteurization of the city's milk supply.

It has been suggested that the consumption of milk infected with bovine bacilli may immunize against later infection with the human type. This view has been chiefly based on the alleged lower virulence for the human subject of the bovine bacillus. It is true that relatively fewer deaths are due to bovine than to human infections. Further, healed lesions in mesenteric glands—nearly always the result of bovine infection—are common findings in adult necropsies. As I have already pointed out,[1] however, the fact that generalization is infrequent in such cases probably depends on the efferents from these glands not draining directly into the blood stream as in the glands associated with the lungs. From the clinical point of view Cumming *et al*[49] and Munro and Walker[50] have found that phthisis due to bovine infection frequently runs a very acute course. Moreover, as Griffin and myself[51] have shown 22 per cent. of cerebral tuberculosis in children is due to the bovine bacillus. In addition to the mortality from bovine infection, it is the cause of much suffering in early life, 53.8 per cent. of surgical tuberculosis in my 1932 series being due to this type. Accordingly, one wonders if the price which we pay for this doubtful immunity is not too high. It has also been suggested that in eliminating bovine infection the incidence of tuberculosis due to the human type may rise, but in Toronto, where bovine infection has been completely eradicated, no increased incidence of disease due to the human type of bacillus has yet been observed.

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ULTRA-HIGH FREQUENCY*

BY

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Short-wave therapy aims at making selected tissues of the body the seat of electrical oscillations of very high frequency. In order to attain this objective the tissues are included in an oscillating circuit in which, subsequently, conditions required to bring about resonance with a high-frequency generator are satisfied. From a practical point of view the administration consists in adjusting the resonating circuit to the exigencies created by the complex load. As only the resonating circuit of a short-wave apparatus primarily concerns the operator, these remarks will be limited to this system, the component parts of which will be dealt with one by one, mentioning their function in relation to the main issue—the treatment of the patient.

The resonating circuit of a short-wave machine can be divided into four parts:

(*a*) The resonating circuit proper.
(*b*) The leads.
(*c*) The measuring instruments.
(*d*) The load.

The resonating circuit proper, like all circuits capable of oscillating, incorporates inductance and capacity; the former is usually in the shape of a coil and the latter in the shape of a condenser. This condenser is most often of the variable type, to enable one to satisfy conditions required for the transference of oscillating electrical energy from the generator proper to the resonating circuit. In order to ensure a balanced output at the electrodes it is essential that the resonating circuit be symmetrical, such a condition being easily obtained by careful design.

* Read in opening a discussion in the Section of Physical Medicine at the Annual Meeting of the British Medical Association, Oxford, 1936.

Simple Resonating Circuit

In its simplest form the resonating circuit of an ultra-high-frequency generator consists of a coil L (see Fig. 1)

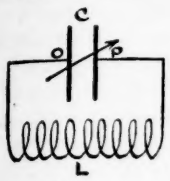

FIG. 1.

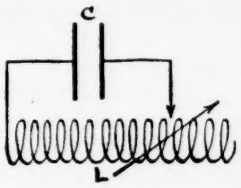

FIG. 2.

with its axis parallel with the axis of the oscillator coil. The ends of this coil are bridged by a variable condenser, C. During operation, when resonance exists—that is, when the product of the capacity by the inductance in the resonator circuit equals that in the oscillator—a high-frequency electromotive force is developed across O and P.

It is possible to subject tissues to high-frequency oscillation by inserting them between the plates of the condenser and tuning in by means of a variable inductance; indeed this method is adopted in certain machines, but disadvantages inherent in variable inductances are likely to appear (see Fig. 2). A more generally employed scheme makes use of two transmission lines attached to points O and P. Such a circuit, with its two leads (see Fig. 3),

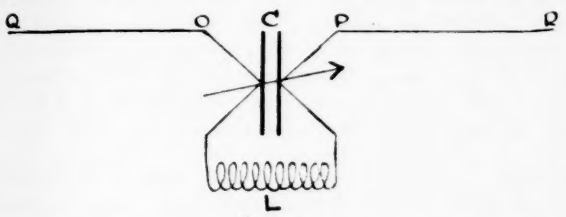

FIG. 3.

is of some importance from the point of view of therapeutic application, as the efficiency of such a system is greater under certain circumstances than others.

If the oscillating circuit CL is tuned to be in resonance with a generator it can be demonstrated by means of a neon indicator that nodes of high voltage exist along the lines OQ and PR, and, furthermore, that the distances between those points bear a direct relation to the wave-length. To take a concrete example: if the apparatus is a six-metre machine the distance between the nodes will be equal to half the wave-length—that is, three metres. Moreover, the highest potential differences will occur at points Q and R when the leads QO and PR are each equal to one-quarter of the wave-length, or one and a half metres in our particular instance. As it is essential to apply the highest possible electromotive force to the patient, particularly when making use of small electrodes, the optimum length of the leads is a quarter of the wave-length.

Experimental Verification

In order to bear out this contention the following experiment was carried out:

Two bare cables were stretched so as to be parallel to one another and a small condenser field was arranged with a patient so as to allow observations to be made at various distances from the machine (Fig. 4). It was found that where nodes of high tension existed, at one-quarter and three-quarter wave-lengths away, heat was developed in the patient, whereas none could be detected with the condenser in antinode positions at a half and a full wave-length away. Briefly, the positions one-quarter and three-quarters of a wave-length away from the condenser C terminals may be considered as nodes of maximum electromotive force and minimum current, while the positions one-half and one wave-length away from the condenser correspond to antinodes of minimum electromotive force and maximum current in the leads.

It is interesting to note here that in a circuit like the one just described the electromotive force measured across the plates of the variable condenser C is directly proportional to the current developed in the patient's con-

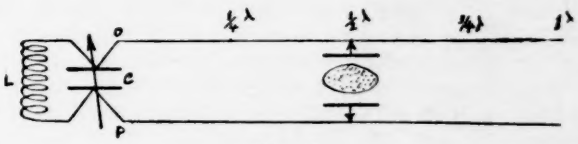

FIG. 4.

denser when the latter is across high-tension nodes. This phenomenon has been exploited with advantage in an ultra-high-frequency generator constructed in this country.

Measuring Current

Referring to Fig. 5, which represents the resonating circuit of the apparatus in question, we see that the tuning condenser C is shunted by two small condensers

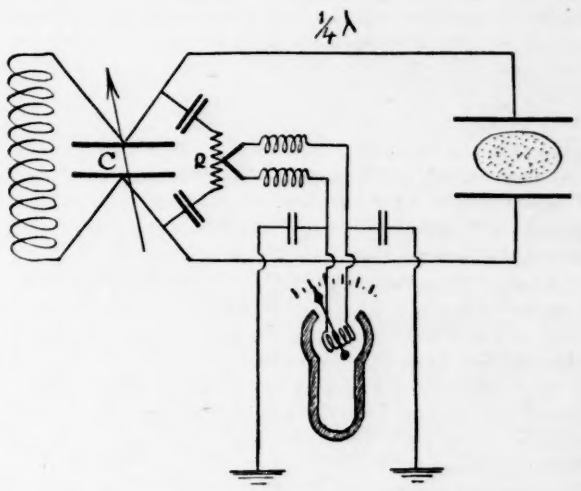

FIG. 5.

connected in series by means of a resistance which acts as the heating element of the thermo-couple, which is connected to a moving-coil instrument. Theoretically, this meter measures the current produced in the meter circuit by the heating of the bi-metal junction. The heating is a function of the electromotive force developed across the condenser C, which, as mentioned before, is proportional to the current in the condenser field provided the leads are one-quarter of the wave-length. This proportionality makes it possible to calibrate the meter in amperes, and thus estimate by direct reading the current in the condenser field. With this method of measuring the current it is important that the patient's leads be exactly a quarter wave-length long, as otherwise readings of the meter are not related to the current between the electrodes.

The Condenser Field

Of all the components constituting the resonating circuit of an ultra-high-frequency generator in operation, the most important and most perplexing is the condenser field when it incorporates a load in the shape of living tissue. Thanks to their complex structure and their heterogeneous composition, tissues when included in an oscillating field bring about alterations which may be summarized as follows:

(*a*) Distortion of the field.
(*b*) Alteration of capacity.
(*c*) Change of power factor.
(*d*) Damping.

The high dielectric constant value of the tissue fluids bestows on them the property of increasing the capacity of the field into which they are introduced, and at the same time they cause distortion.

The density of the field between the plates of an air condenser in an oscillating circuit is, except near the edges, sensibly the same throughout. If, however, a body of higher dielectric constant be introduced into this field, concentration of the field will take place in this body as if its permeability to this force were greater than that of air. Tissues have a very high dielectric constant, and on this account distortion occurs to a marked degree in treatment with ultra-high-frequency, particularly when the space between electrodes and tissues is small. By means of test tubes held in a rack so as to assume various shapes it is possible to determine where concentration of a field takes place under different conditions.

DETERMINING FIELD CONCENTRATION

A rack holding a large number of closely packed test tubes filled with saline was introduced in a six-metre field. Precautions were taken to screen the outer tubes from draughts to avoid uneven cooling. After some time the temperature of the fluids in each tube was measured by means of a thermo-couple instrument and recorded. This experiment was performed with a square rack holding thirty-six tubes with electrodes of different sizes and with various degrees of spacing. It was then repeated with a circular rack holding thirty-seven tubes. Variations of this method of assessing the field strength were adopted.

Besides distorting the field, the introduction of tissue into a condenser field alters the capacity of the condenser as a whole. With this high capacity or power for storing electricity there are associated effects of which the full significance can only be grasped when tissues are regarded as histological structures of great complexity. That is, not as homogeneous masses with a uniform dielectric constant throughout, but as a complicated heterogeneous structure composed of materials of widely varying dielectric constants.

Between the plates of a condenser such a heterogeneous dielectric produces an uneven field distribution of great complexity, and when we stop to consider how mechanical stresses in dielectrics vary with field density and other factors inherent in the nature of the dielectric, then we begin to realize what mechanical strains must occur at high frequency when tissues are submitted to short-wave therapy.

I postulated previously that this irritative process of strains produced at high frequency was responsible for the lowering of the threshold at which defensive tissue reactions take place. In other words, there occurs in deep tissues an effect similar to that termed "esophylaxis," which results from the "insulting" effects of ultra-violet irradiation on the skin. For very good and obvious reasons these reactions cannot be demonstrated by experiments on dead tissues or *in vitro*.

Tissues as a Load

Although, on account of their high dielectric constant, the tissues bestow an increased capacity on the field into which they are introduced, it must be remembered that they also act as conductors to the currents induced in them, and this phenomenon brings into existence two other effects. The most important is the alteration in the power factor. Briefly, when the load in an oscillating circuit is entirely capacitative the power factor is zero and no heat is produced, according to Joules's law, since in such a circuit the current is 90 degrees out of phase with the electromotive force. If, however, a resistive component is included, the power factor tends towards unity and becomes one when the load is solely resistive—that is, when the current and the electromotive force are in step. In a mixed load like animal tissue heat is produced, with a consequent rise in temperature.

The second effect is not of great importance from a therapeutic point of view. It is the damping effect, and occurs in all resonating circuits when the capacity is shunted by resistance. In practice, whereas sharp tuning is obtained with pure capacity, flat tuning results from the introduction of a leaky dielectric. Some authorities reject the suggestion that ultra-high-frequency fields have any action other than the production of a rise in temperature in the tissues, but to this one may object that since tissues act as a capacity—that is to say, since they possess the property of storing electrical energy as a charge—they must become stressed when submitted to electromotive forces in an alternating electric field. Furthermore, actual strains must result from sheer irregularity in the stresses due to the lack of uniformity of field density. These uneven stresses, with consequent straining at high frequency, should not be visualized as causing coarse cellular movement, but rather as producing fine vibrations of smaller particles in various histological structures, calling forth a non-specific defensive reaction.

Although this effect is probably the one which invests ultra-short-wave therapy with its advantage over diathermy, the thermal component of the treatment should not be overlooked. Since a rise in temperature will cause an acceleration of pathological processes as well as of defensive processes, in a large number of conditions it will be found that better results are obtained in fields capable of producing but minimal rises or no rise at all in the temperature.

To summarize, it might be said that in short-wave therapy we have acquired a therapeutic agent capable primarily of making tissues react against antigens and secondarily of causing local pyrexia, thus accelerating biochemical activity.

According to the annual report the Rockefeller Foundation expended 12,725,439 dollars in 1935. It continued its efforts in public health through the International Health Division and supplemented Government agencies in the training of public health personnel and in the control of disease. Problems of individual behaviour and race development were attacked through the programmes of the medical sciences and the natural sciences. Work in mental health was furthered, particularly by aid to the teaching of psychiatry and to the study of the complex phenomena of mental disease and maladjustment. Grants were made for yellow fever studies in Brazil; for research on yellow fever, malaria, and other diseases at the Rockefeller Institute; for field research on malaria in various countries; and for laboratory studies of this disease at the University of Chicago; for investigation and control of hookworm disease in Egypt and in North Carolina; for studies of tuberculosis at Cornell University and in Alabama, Austria, Jamaica, and Tennessee; for the study of yaws in Jamaica and of undulant fever in France; for research at Columbia University on the common cold; for diphtheria investigations in Austria and Peiping; and for studies on influenza, typhoid fever, and small-pox vaccine. In addition, local and central Government health services were aided in many States and countries; and public health education was furthered by grants to institutions. In 1935 the Rockefeller Foundation appropriated 2,733,050 dollars for work in the field of medical science. Of this sum 1,459,450 dollars were contributed to projects for the advancement of psychiatry, and the National Hospital, Queen Square, London, received a grant towards a laboratory building. During the year the Foundation administered seventy-two fellowships in the medical sciences.

SIMPLE ACHLORHYDRIC ANAEMIA, PLUMMER-VINSON SYNDROME, AND CARCINOMA OF THE MOUTH, PHARYNX, AND OESOPHAGUS IN WOMEN

OBSERVATIONS AT RADIUMHEMMET, STOCKHOLM

BY

HUGO E. AHLBOM

Simple achlorhydric anaemia among women is a familiar and fairly common disease which in its main features was described by Faber in 1909 and again in 1913. Dysphagia in combination with anaemia in women was first observed by Plummer in 1914. In 1919 Kelly and Paterson further differentiated this syndrome in which anaemia and dysphagia are the most important features. The syndrome has been called "Plummer-Vinson's syndrome" or "dysphagia associated with anaemia," since Vinson in 1922 supplemented Plummer's observations. Peculiarly enough this disease is hardly known outside of Great Britain and the United States.

Among the British and American authors who have contributed to the knowledge of these diseases some have pointed out the close relationship between simple achlorhydric anaemia and Plummer-Vinson's syndrome, and a few, above all Davies and Witts, both in 1931, have expressed the opinion that they constitute two somewhat different forms of the same disease. Observations upon a large number of cases at Radiumhemmet, the radiotherapeutic clinic of the Stockholm Cancer Society, also point in this direction, as the present report shows.

There are clinical features common to both forms. The patients are almost always females, usually between 15 and 50 years of age. They often give a history of weakness and anaemia of many years' duration, the anaemia frequently observed for the first time at 18 to 20. They usually state that teeth were lost early in life, often as early as 20 or 30 years of age, and that fissures or "eczema" appeared periodically at the corners of the mouth. The patients are pale, and occasionally have a tinge of yellow in the complexion. They are quite thin, and almost always edentulous.

Among our own patients we have not infrequently found a shrinkage of the opening of the mouth, a sign which is usually not described in the literature. The lips are thin and the opening of the mouth is small and inelastic. These changes, together with the absence of the teeth, and perhaps a slight change in the elasticity or consistency of the skin of the face, give these patients a rather characteristic appearance and suggest the diagnosis. The changes in the lips are undoubtedly of the same nature as the atrophy of the mucous membrane which one usually finds in the mouth and pharynx in these patients. This atrophy is most clearly seen on the tongue, which in typical cases is completely smooth.

Although lacking in many cases, a very important sign for the establishment of the diagnosis is the so-called koilonychia, "spoon-shaped nails." Even if this almost pathognomonic deformity of the nails is lacking the patient may say that the nails have been soft and have often broken off. Examination of the blood shows a hypochromic anaemia of varying degree, which, as a rule, is quite moderate. In 20 to 30 per cent. of the cases a moderate enlargement of the spleen is found.

Differential Diagnosis

The differential diagnosis between achlorhydric anaemia and Plummer-Vinson's syndrome depends upon: (1) the occurrence of dysphagia only in the latter; and (2) constant achlorhydria in the former, whereas the Plummer-Vinson cases may in some instances have retained the capacity to secrete hydrochloric acid (Cameron). I consider it debatable whether these differences are not in reality only apparent or artificial. A patient with all the signs of simple achlorhydric anaemia but without achlorhydria cannot be given that diagnosis because the achlorhydria is included in the definition, but if such a patient has dysphagia the diagnosis of Plummer-Vinson's syndrome is made unhesitatingly. If, instead, we regard all these cases as belonging to a single group, anaemia becomes the only constant sign, with the possible exception of an early loss of teeth. It is true that achlorhydria, together with other signs, is usually found, but in certain cases the secretion of acid is more or less preserved.

We have often observed that even patients who have had a rather marked degree of difficulty in swallowing for twenty or thirty years before admission have not spontaneously mentioned this fact to the examiner. They regarded their inability to take more than "small swallows" more as an individual peculiarity than as a disease symptom. The dysphagia is in many cases so slight that it requires a very careful questioning in order to establish its presence. It is possible that for this reason the history of dysphagia is occasionally overlooked, and the patient is thus counted among the group with simple achlorhydric anaemia instead of among the Plummer-Vinson group. We have been able to show that this has happened in several cases which have been previously treated at other hospitals. In our material, if the mildest degrees of dysphagia are included, we have found cause to assign most of the cases to the Plummer-Vinson group, whereas it is usually stated in the literature that the number of cases in the Plummer-Vinson group is considerably smaller than in the other group.

The cause of the dysphagia has been the subject of a lively discussion in the literature. The opinion most generally accepted at present is that the dysphagia undoubtedly depends upon an organic change in the pharyngeal and oesophageal mucous membrane of the same atrophic character as that observed in the mouth. A reflex spasm or, possibly in certain cases, atony of the pharyngeal musculature might also be considered as a contributory factor. The difficulty in swallowing is usually localized in the post-cricoid part of the hypopharynx and the upper end of the oesophagus.

Relation to Carcinomata of the Upper Portion of the Digestive Tract

Four or five years ago at Radiumhemmet we saw for the first time two women, about 50 years of age, who had had obvious symptoms of Plummer-Vinson's syndrome since 20 to 30 years of age. Both these patients have shown marked predisposition to mouth carcinoma: one of the patients has had five different carcinomata in the lip and oral cavity up to the present time; the other patient has had three carcinomata. Our attention was drawn by these two cases to simple achlorhydric anaemia and Plummer-Vinson's syndrome, and we began to search for these syndromes among the female patients at Radiumhemmet. We soon found that we could obtain considerable evidence of their occurrence in about one-half of all women with carcinoma of the mouth, and also in a great majority of women with carcinoma of the hypopharynx or upper portion of the oesophagus.

A review of the literature dealing with the aetiological and predisposing factors in mouth and pharyngeal carcinomata shows that simple achlorhydric anaemia and Plummer-Vinson's syndrome are not mentioned at all.*

* Wassink has found that many Dutch women with cancer of the upper end of the oesophagus and a few with cancer of the mouth present some characteristic clinical features. From his description it seems almost certain that it is a question of Plummer-Vinson's syndrome, which is not mentioned, however. (Wassink, W. F.: *Gen. Bladen*, 1933, xxi, 1, and *Nederl. Tijdschr. v. Geneesk.*, 1935, lxxix, 29.)

However, a few of the authors—as a rule British laryngologists and internists—who have studied Plummer-Vinson's syndrome, have recognized the risk of the development of hypopharyngeal carcinoma in these cases. Kelly, Paterson, and Turner have emphasized this risk, and Cameron has pointed out that women with Plummer-Vinson's syndrome often develop hypopharyngeal carcinoma in the region in which the changes in the mucous membranes are especially distinct. He assumed that the same aetiological factor in one case produced hypopharyngeal carcinoma and in the other case led to Plummer-Vinson's dysphagia. A few cases of post-cricoid carcinoma with a background of dysphagia of long duration are briefly mentioned in the literature, but Suzman has given a detailed account of a case with Plummer-Vinson's syndrome in which a carcinoma developed in the mesopharynx. Other than this, one finds only vague allusion to the fact that the syndrome in question may induce a precancerous condition in the hypopharynx ; and Plummer-Vinson's syndrome has nowhere been mentioned in connexion with carcinoma of the mouth in women, except for a case report by McGibbon of a patient with Plummer-Vinson's syndrome showing precancerous changes and multiple early carcinomata in the mucous membrane of the mouth. In the voluminous literature on simple achlorhydric anaemia I have been unable to find any reference to the fact that this condition predisposes a patient to carcinoma.

Analysis of Cases

Since 1931 we have seen about two hundred and fifty women with squamous-celled carcinoma of the mouth, pharynx, and oesophagus. One hundred and fifty of these have been questioned and examined with reference to signs and symptoms suggesting simple achlorhydric anaemia or Plummer-Vinson's syndrome, and the findings have been positive in about 70 per cent. This means, therefore, that we have seen during the past five and a half years no fewer than one hundred women with carcinomata who have also had one or other of these syndromes. Of these eighty patients the majority—about seventy—have had dysphagia, although in many cases this symptom has been quite insignificant. Follow-up examinations are now being made with this syndrome in mind, and in the near future I hope to be able to give, in a more detailed publication, definite figures of its frequency.

Even at the present state of the investigation, however, it is clear that a relationship exists between simple achlorhydric anaemia and Plummer-Vinson's syndrome on the one hand, and squamous-celled carcinoma within the upper portion of the alimentary tract on the other. It is most probable that this relationship has its foundation in the atrophic changes in the mucous membrane which are associated with the anaemic conditions in question. I am inclined to believe that carcinoma develops gradually in this mucous membrane in somewhat the same manner as, for example, in the scarred skin after a burn, after lupus, or after irradiation. Suzman has observed epithelial changes of a precancerous type in the mouth and pharyngeal mucous membrane of a case of Plummer-Vinson's syndrome at necropsy.

The association of these syndromes is especially striking with respect to post-cricoid carcinoma. This form of tumour is typically a tumour of women. From the few small statistical surveys which have been published it appears that in most countries from 70 to 90 per cent. of these patients are women. This is all the more remarkable since, according to the statistics for mouth carcinoma and pharyngeal carcinoma in most countries, women make up only 5 to 25 per cent. of the patients affected. In our material about 90 per cent. of the patients with post-cricoid carcinoma are women, and about 90 per cent. of these women have either Plummer-Vinson's syndrome or simple achlorhydric anaemia. I am convinced that, in other countries where women constitute the majority of these cases of carcinoma, the syndromes in question will also be found quite frequently.

Other Predisposing Factors

In our Swedish material about 40 per cent. of the cases of carcinoma of the mouth occur in women. This is quite an extraordinary proportion. I am inclined to see the reason for this in a larger incidence of Plummer-Vinson's syndrome and simple achlorhydric anaemia in Sweden than in most other countries. In many countries men make up the majority of these cases (not infrequently 90 to 95 per cent.), and this fact has been used to support the opinion that tobacco, alcohol, and syphilis play a large part in the development of mouth carcinomata. In Sweden, where mouth carcinomata appear among women and men in about equal proportions, alcohol and syphilis are relatively unimportant with respect to women. The peasant women smoke pipes in certain districts, however, and this cannot be denied a certain importance in the development of carcinoma in some cases, especially in lip carcinoma. Of our women patients with carcinoma of the lip about 50 per cent. are pipe smokers. In mouth carcinoma in general only about 15 per cent. of the women have used tobacco. However, since about half of these women with mouth carcinoma have had Plummer-Vinson's syndrome or simple achlorhydric anaemia, one cannot deny that this syndrome is considerably more important as a predisposing factor in women than other heretofore known factors.

Taylor has recently studied a large number of cases of mouth carcinoma in women from an aetiological viewpoint. He did not regard tobacco or syphilis as important, but considered that irritation by prostheses was the most important predisposing factor. The great majority of the female patients were in fact edentulous. I venture the opinion that the absence of teeth among Taylor's patients may in many cases have been in reality only one sign of a simple achlorhydric anaemia or a Plummer-Vinson syndrome. In any case, prostheses can hardly be blamed for the development of post-cricoid carcinoma occurring typically in women.

The distinct relationship which appears to exist so often in Sweden between simple achlorhydric anaemia and Plummer-Vinson's syndrome, and carcinoma in the mouth, pharynx, and oesophagus, may perhaps also be demonstrated in other countries, even if their significance may not be so great as among our own patients. This relationship must be considered as having great practical significance as well as theoretical interest.

Practical Significance

From a practical standpoint it is of great importance that these two anaemic conditions be diagnosed early, and that the women suffering from them receive effective treatment. This pertains not only to the treatment of the disease as such, but also to the attempt to forestall the development of carcinoma. The patients must therefore be followed up by repeated examinations and the treatment renewed when necessary. If the dysphagia becomes worse roentgen examination and possibly hypopharyngoscopy and oesophagoscopy should be performed. In this manner, if carcinoma appears in spite of the " prophylactic " treatment, it should be possible to make an early diagnosis. The outlook for obtaining good results with prophylactic treatment is rather favourable, since we have quite an effective remedy for simple achlorhydric anaemia and Plummer-Vinson's syndrome —namely, iron in large doses. All authors in this field are agreed upon its rapid and almost specific effect.

Iron Deficiency

Good therapeutic results, together with other facts, have caused many investigators to regard these anaemic conditions as deficiency diseases. It is thought that an insufficient supply of iron may be of primary aetiological significance. This deficiency in iron is caused partly by food poor in iron, partly by decreased absorption of iron from food because of digestive disturbances. Woman, owing to menstruation, pregnancy, and lactation, has a larger expenditure of iron than man, and there has been a desire to explain the appearance of the disease predominantly in the female sex on this basis. Davidson and his associates, who have recently examined the iron content of the food of the poor people in Aberdeen, found that the amount in their diet was as a rule insufficient. In a series of 3,000 individuals from this element of the population they observed that a large number were anaemic, but that all of the cases with anaemia occurred among the women. About half of all the women were anaemic, and these anaemic individuals were, as a rule, between 18 and 50 years of age. In Sweden the poorer element of the population exists on a diet which is undoubtedly poor in iron (a small amount of meat, very little fruit, and practically no green vegetables); and it is possible that the numerous cases of carcinoma in women in our material may be related to this fact. A certain amount of support for this opinion is obtained from the fact that in Radiumhemmet's material of comparable cases of carcinoma among the better situated classes only 20 per cent. is made up of women, and of these women only two cases have had any sign of Plummer-Vinson's syndrome.

These aetiological speculations are, of course, indefinite. We must acknowledge that we do not yet know the cause of these anaemic conditions. If their aetiology were completely clear and we had, moreover, a truly specific therapeutic agent at our disposal, we should be able to speak of an effective prophylaxis in women against hypopharyngeal carcinoma in particular, and also against carcinoma of the mouth.

Conclusion

The syndromes discussed should command the attention of cancer investigators when looked at from this viewpoint, as these syndromes undoubtedly constitute excellent examples of conditions which are precancerous. Their tendency to predispose to carcinoma must be greater than, for example, that of syphilis, for a far greater proportion of our patients with carcinoma of the mouth and pharynx have these syndromes than have syphilitics, even though the incidence of syphilis probably is many times greater in the general population.

It also appears to be of great theoretical interest that in many of these cases the foundation for a carcinoma appearing at 50 or 60 years of age is already laid during the years immediately following puberty, or perhaps even earlier.

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ACUTE INFECTIVE POLYNEURITIS*

WITH A REPORT OF FIVE CASES

BY

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Acute infective polyneuritis is a comparatively rare disease, appearing practically at any time, but mainly affecting young males between the ages of 20 and 40. It is by no means a new disease, for Viets[1] in his abstract records that Graves gave a clinical description of this disease in 1828, and Duménil in 1846 placed multiple neuritis as a definite entity.

The disease has been shown by Wilson[2] to be caused by a living virus, which was successfully transmitted from man to monkey and recovered in pure culture; but in many later cases such conclusive evidence has not been obtained. A toxin, however, is produced which seems to have a selective action on the lower motor neurones, causing a chromatolysis of the ganglion cells of both the anterior horns and posterior roots, when a rapid segmental spread may occur, either ascending or descending to involve the whole cord. The toxin reaches the cord by absorption from the peripheral end-plates of the motor and mixed nerves, which show a true neuritis with swelling and fragmentation of their axis cylinders.

Types of Cases

Collier[3] describes the cases as falling into two types. The first is that of a four-limb peripheral neuritis associated with an external ophthalmoplegia, the malady being apyrexial and painless with a rapid onset. In some of the cases the ophthalmoplegia is severe and may be absolute so far as the external muscles are concerned, the internal muscles escaping, while the limb paralysis may be slight, only showing itself by a weakness of the extensors of the periphery with an absence of reflexes. In other cases the limb paralysis is severe while the ophthalmoplegia is slight. The second group of cases resemble those described by Gordon Holmes[4] and Bradford, Bashford, and Wilson[2]; they have a slight pyrexia with a less rapid onset. They also show a four-limb polyneuritis, but accompanied by a facial paralysis and often a slight general bulbar weakness. Here again the limb paralysis is in some patients the dominating part of the picture, while in others the facial paralysis predominates.

A third group of cases, however, must be included which start as a lower-limb polyneuritis, spreading rapidly upwards to involve the trunk and finally the muscles of respiration. This group cannot be distinguished from what is known as Landry's paralysis, for there is little doubt that the two are due to a similar cause, and, as Grainger Stewart[5] has stated, any distinction is artificial.

Motor and Sensory Symptoms

In all these groups the paralysed muscles are flaccid, but do not show much wasting, and the reflexes are sometimes surprisingly obtained when voluntary power is almost absent. The paralysis also need not be truly peripheral, and is often more proximal than distal, so that a patient may be seen to have some movements of his fingers and toes though unable to move arm or leg. Sensory symptoms are usually present, being described in the early stages as pain or numbness and tingling in

* Abstract of address to the Stratford Division of the British Medical Association, March, 1936.

the limbs, later some impairment to light touch being commonly found. The sphincters are hardly ever involved, but an exception is seen in Case III. The electrical reactions tend to be sluggish, but do not show the reaction of degeneration which is found in poliomyelitis.

Case I

A male, aged 30, eleven days before admission to hospital, complained of headache and pains in the back, with nausea and vomiting. He had been playing tennis in the hot sun, and it was thought that he was suffering from the effect of this. Eight days before admission he complained of weakness in all four limbs, more marked in the legs than in the arms. On admission he was apyrexial, with a four-limb polyneuritis and slight right-sided facial weakness. The weakness of the upper arms was more marked than that of the forearms and fingers; there was some weakness of the muscles of the lower abdomen and back, with involvement of diaphragm; contraction of the quadriceps was just obtainable, and the extensors and flexors of the foot were weak. All reflexes were absent. There was a slight loss of sensation to pin-prick and light touch tests in both legs. The electrical reactions were sluggish, but there was no reaction of degeneration. The cerebro-spinal fluid was examined on nine occasions; the colour varied from brown to yellow. There were never more than six cells present, and the proteins were always markedly increased, the highest reading being 0.25 per cent.

After four days the movements of the diaphragm became stronger, and after ten days the arms improved and the leg muscles were contracting well.

Gradual improvement was maintained for two months, when an acute exacerbation with rapid ascending spread of paralysis again occurred, involved the diaphragm, and was followed by bronchopneumonia and death.

Case II

A male, aged 28, one week before admission complained of sore throat; two days before admission complained of weakness of the left side of the face, with a feeling of numbness and difficulty in smiling, speaking, and talking; he had no vomiting. On admission there was slight pyrexia—99.5° F.; ptosis of both eyes, complete in the left eye; external ophthalmoplegia with nystagmus; and bilateral facial paresis, more marked on the left than on the right. There was a four-limb polyneuritis, paralysis being more proximal than distal, so that movements of the fingers and toes were always possible; all reflexes were absent. The sense of light touch was impaired in the hands, arms, and legs. The cerebro-spinal fluid was clear and yellowish, with never more than two cells per c.mm.; protein was always markedly increased, up to 0.12 per cent.

After fourteen days the right facial weakness was improving and the abdominal reflexes were present; after three weeks he was able to write; after one month the knee-jerks were present; and after two months he was discharged with slight weakness of the left face only.

Case III

A male, aged 44, nine days before admission complained of loss of power in the arms and legs, with retention of urine. On admission he was apyrexial and had a four-limb polyneuritis, with involvement of the trunk muscles and partial involvement of the diaphragm. There was no involvement of cranial nerves; weakness in the arms was more marked distally; the legs were completely paralysed; reflexes all absent, but there was no sensory involvement. Catheterization was necessary to relieve retention with distension of the bladder. There was no reaction of degeneration in the muscles. The cerebro-spinal fluid showed excess of albumin.

Eight days after admission slight movements of the fingers and toes were possible, and nearly full movements of the shoulders; the abdominal muscles also could be made to contract. After sixteen days the movements of hands and feet were much improved, but catheterization was still necessary to relieve the retention of urine. Ten weeks later he was discharged well

Case IV

A male, aged 27, five weeks before admission complained of weakness gradually spreading upwards in both legs, and later weakness of the arms, more marked in the hands and wrists. On admission he was apyrexial, and had a four-limb polyneuritis with involvement of the lower trunk muscles and the diaphragm; there was bilateral facial weakness with some bulbar involvement. The cerebro-spinal fluid was not examined.

Two days after admission there was complete diaphragmatic paralysis; soon after, however, improvement began. In ten weeks he was discharged to a convalescent home, able to walk with sticks. After three weeks there exacerbation occurred with a fresh spread of paralysis, so that on re-admission he had a four-limb polyneuritis with complete paresis of the legs, partial paresis of the arms, and all reflexes abolished. One month later there was definite improvement, and after fourteen weeks he was discharged, walking with support.

Case V

A male, aged 32, nine days before admission had complained of coryza and sore throat; three days before admission he complained of pins-and-needles in the arms and legs, with increasing weakness; two days before admission he developed nasal speech and diplopia. On admission he had vomited; had a four-limb polyneuritis, complete external ophthalmoplegia of both eyes, and the pupils reacted sluggishly to light and accommodation. The trunk was not involved, and movements of the hands were obtainable. There was complete paresis of the legs, and the reflexes were absent in both arms and legs. The cerebro-spinal fluid showed no increase in cells, but a marked excess of protein.

After ten days the palatal muscles recovered and the ophthalmoplegia began to improve. Six weeks later he was able to walk and the knee-jerks were obtained. After two months he was discharged well, though there was still some diplopia present.

Discussion

If an attempt is made to fit these cases into the above three clinical groups we find that Case I, at its onset, and Case IV seem to fall into the second group. But Case I terminated fatally with a rapid ascending spread of paralysis identical with that of the cases forming the third group. Cases II and V seem to combine the characteristics of the second and third groups, for Case II showed both an ophthalmoplegia and a facial paralysis, while Case V showed an ophthalmoplegia with a bulbar paresis. Case III is of interest in showing sphincter involvement with no affection of the cranial nerves. From this it is apparent that difficulty will occur when trying to fit cases into any definite clinical groups, and that any such grouping must be artificial.

Prognosis and Treatment

The mortality is high, but this varies in the series of cases which have been described, tending to be higher in the small epidemics of this disease. In Bradford's series eight died out of thirty, while in the present series out of five patients one died. The prognosis must always remain, however, somewhat uncertain, even later in the course of the disease, owing to the frequency with which exacerbations, with a further rapid increase of paralysis, may arise, but the cases which recover tend to do so completely. I have been tempted to give a prognosis based on the appearance and chemistry of the cerebro-spinal fluid, a brown or yellowish tinged fluid with a high protein content, which points to a vigorous reaction, appearing to justify a better prognosis than a clear fluid which shows only slight or no alteration.

There is no specific treatment, but frequent lumbar punctures, especially where a high protein fluid is obtained, continued until that protein content falls, appears to hasten the rate of recovery.

Conclusions

1. Five cases are described of acute infective polyneuritis, a disease which appears to have become more prominent recently.
2. The three main clinical groups usually described are recorded.
3. The difficulty of accepting any such definite grouping is discussed.
4. A prognosis based on the appearance and chemical findings of the cerebro-spinal fluid is suggested.

I am indebted to Dr. Anthony Feiling and Dr. Harold Pritchard, under whose care three of the patients were admitted, for permission to publish these cases.

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Clinical Memoranda

An Unusual Case of Mastoiditis

The following case seems to be of interest as an unusual and puzzling type of mastoid disease.

A boy aged 5 was admitted to hospital on November 23rd, 1935, having been taken ill four days previously, and since complained of almost continuous severe frontal headache (chiefly right-sided), with frequent vomiting. He had a sore throat a week previously, and frequent earache (without otorrhoea) for six months; the earache had recurred on the right side during the last two days. Tonsils and adenoids had been removed two years previously.

On admission his temperature was 99° F.; he had a coated tongue, flushed cheeks, and slight circumoral pallor. Pharyngitis was present; the left ear drum appeared normal, and the right oedematous and dull; no glands were felt in the neck. No abnormality was found in the nervous system. The nasal edges of the optic disks were a little blurred.

On November 25th his temperature rose to 102°; the posterior quadrant of the right drum was red and bulging, and there was a large very tender gland in the right posterior triangle of the neck. Myringotomy was performed on the right side, and a little serous exudate found, but no pus. During the next week the drum was obscured by inflammatory oedema of the posterior meatal wall, which was attributed to trauma during myringotomy; when this subsided the drum was found to appear healthy. A transitory injection of the left drum was observed. At no time was there any oedema or tenderness over either mastoid. *X*-rays taken on November 29th and December 5th showed dense mastoids, with no difference between the two sides and no evidence of infection. Swabs taken from the throat and right external auditory meatus on November 27th, and from the throat on December 5th, gave on culture profuse growths of *Staphylococcus aureus*.

Headache and earache seemed to diminish from the time of admission, and neither was complained of after November 28th. From November 25th to December 11th the temperature varied irregularly between 98° and 103°. The boy was irritable at times, but at no time unduly drowsy; he remained interested in his surroundings and in comic papers, and anxious for meals, and did not vomit. On November 28th mild papilloedema was definitely present; this gradually subsided (more completely in the right eye than the left) for a week, and then increased until operation. Kernig's sign was positive on November 30th for the first time, and neck rigidity remained, although the tender swelling in the neck was subsiding. Rigidity persisted in varying degrees until after operation. No other nervous signs were observed, except diminution of the left knee-jerk on December 4th and subsequent days.

Results of lumbar puncture are shown in the following table:

Date	Pressure	Appearance	Cells	Globulin	Total Protein per 100 c.cm.	NaCl per 100 c.cm.	Glucose per 100 c.cm.	Cultures
					mgm.	mgm.	mgm.	
Nov. 27th	Normal	Clear	7 per c.mm. (partly polymorphs)	No excess	50	660	47	Sterile
Nov. 29th	"	"	160 per c.mm. (35 % polymorphs)	Nil	50	660	40	"
Dec. 3rd	"	"	85 per c.mm. (30 % polymorphs)	"	25	643	50	Staph. aureus
Dec. 6th	Increased	"	11 per c.mm. (20 % polymorphs)	"	50	709	54	Sterile
Dec. 9th	"	Turbid	1,250 per c.mm (85 % polymorphs)	Small excess	100	693		Staph. aureus
Dec. 14th (after op.)	"	Clear	231 per c.mm. (75 % polymorphs)	+	300	693	32	Sterile
Dec. 27th	Normal	"	2 per c.mm. (lymphocytes)	Nil	25	707	50	"

Blood counts showed a moderate polymorphonuclear leucocytosis; blood culture was negative.

On December 11th, because of the history of right-sided otitis media, and in spite of the absence of signs of mastoiditis, it was decided to operate on the right mastoid. Pus was found in the mastoid antrum and such cells as were present.

There was a large peri-sinus abscess, and the lateral sinus was thrombosed from the torcula to the jugular bulb. The lateral sinus having been opened up and packed, an incision was made in the neck over the jugular vein. The latter was found, with difficulty, embedded in a mass of glands, and was filled with organizing clot down to and beyond the thoracic outlet. The thrombus in the neck was left *in situ*, a drainage tube being inserted into the wound in the vein.

The temperature was settled within a week of operation; the patient made an uneventful recovery, and thoroughly enjoyed the Christmas festivities.

I am indebted to Dr. O. C. M. Davis and to Mr. Angell-James, who performed the operation, for permission to publish this case.

M. C. A. ROBSON, B.Ch., M.R.C.S.
Bristol Children's Hospital.

Multiple Cardiac and Pericardial Ruptures

The following record is of a rare and interesting case.

On the evening of May 8th, 1936, I was called in to a case of sudden collapse, a man aged 67; unfortunately he was dead within a few minutes, and as he had not been seen recently by any medical man I was asked to perform a post-mortem examination The pericardial sac was full of blood. There was free fluid in the mediastinum, and there were three large ruptures in the posterior wall of the pericardium. The whole of the anterior wall of the pericardium was calcified—in parts a quarter of an inch thick—and the posterior wall was slightly calcified. The right auricle and the first part of the aorta, which was very atheromatous, were also ruptured. The lungs and pericardium were very adherent, as were the meninges. The right kidney was almost non-existent, and the left kidney was twice normal size. The heart was not enlarged and the muscle was in fair condition.

I have had great difficulty in obtaining any history. Prior to his death the patient had just bent down and said he felt giddy; his previous medical history was a recent urethral stricture. The lack of previous history is quite in keeping with these cases. The main interest lies in the multiplicity of the ruptures and in the fact that there are only about 100 recorded cases.

Gillingham, Kent. DALTON Y. CARTER.

Reviews

VASCULAR DISORDERS OF THE LIMBS

The book with this title[1] sets forth, with Sir Thomas Lewis's characteristic clarity, the methods which practitioners and students should learn to employ in the investigation and treatment of the rather more obscure disorders of the peripheral circulation. Those who are familiar with Sir Thomas's other publications know that his painstaking observations involve the use of apparatus which is unsuitable for everyday practice, but he is careful to point out that he is here concerned with the conclusions and practical applications of those more elaborate researches, and that the methods he advocates are well within the compass of a busy doctor. It has been his object to advocate more accurate clinical observations by noting the patients' response to certain physiological stimuli, and also to direct criticism against the commonly accepted theory that almost all changes in skin colour and temperature are dependent upon some disorder of the vasomotor nerves.

After a masterly account of the important features to be noted when examining a case of vascular disorder in a limb, he proceeds to describe the effects of arterial obstruction by embolism, external pressure, and structural disease of the vessel walls, and in each group he assesses the value of the various forms of therapy, including surgery. His opinions are based for the most part on personal experience, and since he does not hesitate to record failures as well as successes his advice will prove of the greatest help to those who are faced with the management of these difficult and often distressing conditions.

Attention is then directed to a surprisingly large number of disturbances in which the phenomena are alleged to result from an abnormal response of the vessels to physiological stimuli. In this group are placed Raynaud's disease, scleroderma, acrocyanosis, erythrocyanosis, and erythralgia, and it is interesting and instructive to follow the observations and deductions to prove that the fault lies not in the vasomotor nerves but in the vessels themselves, though what the "fault" may be is not revealed to us. At all events our notions regarding the nature of these conditions have been clarified, and our inability to cure them by resection of vasomotor nerves is now explained, though we are still far from a complete understanding of their cause, and the oedema which is so often associated with defective peripheral circulation remains a mystery.

The final chapter gives a straightforward account of the physiological considerations underlying the changes in the circulation in diseases of the central and peripheral nervous systems, and shows that the phenomena previously regarded as due to interruption of "trophic" impulses are to be explained largely by the effects upon the vessels of disuse and muscular inactivity. The whole book deserves diligent and thoughtful study, which will repay the reader by making him a more careful clinician and a more thoughtful critic of popular fallacies.

A MANUAL OF PRACTICAL OBSTETRICS

It would be difficult, if not impossible, to estimate the profound effect that *Practical Obstetrics*, by Tweedy and Wrench, exerted on British midwifery. Dr. O'Donel Browne has made the attempt to provide a simple and practical textbook incorporating what may be termed "the Dublin methods," and calls it *A Manual of Practical Obstetrics*.[2] It is a well-written book, attractively published, and most of the illustrations actually show what they are meant to show. The author has almost eschewed theory, and he may therefore be forgiven for his somewhat archaic views on the toxaemias of pregnancy and for the fact that he still thinks it necessary to treat cramps with either luminal or potassium bromide. It is an omission that he nowhere describes how the patient is to be prepared before an obstetric operation or mentions the antiseptics he uses.

Dublin methods have not a universal appeal, but with the advice to treat primary uterine inertia with "long hot vaginal douches" and to give an intrauterine douche if more than half of the amnion is retained many obstetricians will legitimately quarrel. The author advises the routine instillation of drops of a 2 per cent. solution of silver nitrate into the infant's eyes on each of the first three days of its life. Most authorities are content with the use of a 1 per cent. solution on one occasion, and it is difficult to believe that the heroic measures advocated do not damage the eyes. Perhaps the weakest chapters in the book are those concerned with contracted pelvis. Part XI, dealing with the infant and consisting of two chapters, is well written by Dr. R. F. Collis, while a very clear chapter on "Radiology in Obstetrics" is contributed by Dr. C. L. McDonogh. There are two appendices, one on "Blood Typing," by Dr. G. C. Dockeray, and the other on "The Technique of the van den Bergh Test."

This is a very good book and meets a need, but the author will be the first to appreciate that it is not yet what "Tweedy and Wrench" was.

SURGICAL EMERGENCIES IN CHILDREN

Very few would deny that the medical profession at large is more prompt to recognize and more efficient to treat acute surgical conditions in adults than when they occur in children. This inequality will probably always remain. The young will always be inarticulate and resentful of examination; they will always tend to remain collapsed and uncomplaining in conditions which would rouse an adult to protests sufficient to overcome even the calm of Christian Science relatives. But in spite of all this such works as Mr. H. C. Edwards's *Surgical Emergencies in Children*[3] should serve to reduce the present number of avoidable disasters.

This book contains many excellent things. It would be difficult to give sounder advice on the anaesthesia of children in a short space than is found in the chapter by Dr. Vernon Hall. He recommends paraldehyde as the best basal hypnotic, and provides some much-needed remarks on the dangers of unskilled administration of gas and oxygen. The only criticism that might be made is that a positive warning against the use of chloroform would have been better than a complete ignoring of what is, after all, a drug very commonly used upon shocked and starved children. The section on the abdomen is much the most important one in the book, taking up a full third of its pages. It shows much clinical experience and thought blended into sound advice. If the rules laid down for the diagnosis and treatment of appendicitis in the young were more widely followed many tragedies might be averted. A weak point here, as elsewhere in the book, is the lack of references to enable the reader to investigate further subjects which, owing to limitations of

[1] *Vascular Disorders of the Limbs. Described for Practitioners and Students.* By Sir Thomas Lewis, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P. London: Macmillan and Co. Ltd. 1936. (Pp. 111; 5 figures. 6s. 6d. net.)

[2] *A Manual of Practical Obstetrics.* By O'Donel Browne, M.B., B.Ch., B.A.O., F.R.C.P.I., L.M., M.C.O.G. Bristol: J. Wright and Sons Ltd.; London: Simpkin Marshall, Ltd. 1936. (Pp. 363; 236 figures, 10 plates. 20s. net.)

[3] *Surgical Emergencies in Children.* By Harold Clifford Edwards, M.S., F.R.C.S. London: Baillière, Tindall and Cox. 1936. (Pp. 274; 99 figures. 12s. 6d.)

space, cannot be fully described. For instance, duodenal drainage by suction, so useful in many cases of ileus, is touched on too briefly to enable anyone to master its complicated details ; and no mention is made of such work as that of Wangensteen on the subject.

In the chapter on the chest the limitations imposed by the length and the subject of the book become more apparent. It is recommended that the drainage tubes in an empyema should be removed in from four to seven days from their insertion, without any consideration of what conditions may then exist inside the chest. Many surgeons would expect the following of this advice to result in a fairly large percentage of chronic empyemata ; but for information on this one is referred to " textbooks on surgery." The treatment of fractures is well described within the small space allotted to it. In acute osteomyelitis the author recommends guttering, with the extention of this process into healthy bone to be followed by a modified Winnett Orr treatment. In acute infective arthritis aspiration is only mentioned as a means of diagnosis ; there is no reference to the possibility of curing some of the less virulent cases by this alone, and so avoiding the usual disastrous functional results of open drainage of a joint. Mr. Geoffrey Bateman writes upon the ear, nose, and throat, with the difficult task of describing many complicated conditions within some fifty pages. The advice given for one constantly recurring emergency of childhood—that of haemorrhage after tonsillectomy—brings out the curious but undoubted fact that bleeding in the tonsillar fossa is generally regarded and treated in quite a different way from a similar condition elsewhere in the body. Plugging the wound after mastoidectomy is recommended, with an anaesthetic on the first occasion it is done.

The final impression given by the book is that the ground chosen is not fully covered. If all the sections were up to the standard of the best ones it would be a most excellent work ; but it would be at least three times as long.

SPIRITUAL MINISTRATION TO THE SICK

In a volume entitled *The Art of Ministering to the Sick*[4] we have the result, both literary and practical, of the co-operation of a doctor of medicine and a bachelor of divinity. The practical co-operation has been mainly at the Massachusetts General Hospital, and the joint authorship is the outcome thereof. This is unusual, but the result is one for which no doubt many readers will thank Dr. Richard C. Cabot and the Rev. Russell L. Dicks. It is addressed primarily to the clergy and ministers, but, as the authors hope, it will certainly be found of interest to doctors, nurses, some social workers, and others whose duty it is to care for ill persons. It is concerned with the opportunities, principles, and methods of spiritual consolation and help in time of sickness, and touches scarcely at all, and only incidentally, upon that other field, frequently spoken of as " spiritual healing," in which the needs, the difficulties, and the limits of co-operation between members of the clerical and medical professions are now being more seriously and scientifically discussed. In its own field the authors emphasize " the strength of the alliance between doctor and minister." They are possibly right in thinking that there has hitherto been no adequate book on this subject.

The volume has, at any rate for the English medical reader, and probably for other readers in this country, certain drawbacks and imperfections. Being American in origin and authorship it is not surprising to find it much too long, and frequently too much occupied with detailing the obvious. American readers seem to require a laborious analysis of facts which here are commonly accepted, and the elaborate statement of reasons for opinions which are almost universally held by thoughtful persons. More important than this is the initial failure to make any clear distinction (whatever this may be) between " mind " and " soul." In the very first chapter we read :

" If a man is smashed, the doctor can see whether he has lost a leg, an eye, or an ear. With more expert study he can find out whether any internal organ is injured. But who can survey a human being's mind? Who can state authoritatively whether all its proper powers are present, whether any of them are rudimentary, atrophied, hypertrophied, or perverted? The psychiatrist has no authoritative list that he can check up. But it is more nearly the minister's business than anyone else's to make one. . . . We do not assume that the minister can get adequate information about the patient's soul in a few minutes: but we believe that, unless he makes the attempt to collect a workable knowledge of it, no one else will."

The sudden transition from " mind " to " soul " in this passage is but an example of confused thinking which an attempt should have been made to clarify at the outset, and which in several later instances vitiates the effect of otherwise admirable statements. Still more serious—and, as we think, essentially false—is the severe limitation placed upon the sphere of the doctor. This is indicated in the above quotation, but is displayed with almost unbelievable crudity in the chapter entitled " What the Doctor is Like." Thus :

" Concentration on diagnosis absorbs him so fully that he gives little thought to the patient's life and character. It is none of his business. He has little idea of what is in his patient's mind. He can treat his disease without that and he has no time for it. But now and then the patient's hopes, fears, longings, sorrows, affections, habits of mind, are prime facts for diagnosis and treatment. Doctors see many of these facts but have learned to disregard them because they do not contribute to the one aim on which the doctor has taught himself to concentrate. He necessarily ignores them. It is for the public good that he should concentrate on the physical-chemical side of his patients and not try to spread his attention over mental and spiritual problems in which he has no skill. He is a practical man with little urge to meditate or theorize. He leaves such things to others, certain that they are out of his line."

Such a doctrine would not be accepted for a moment by the great majority of medical practitioners in this country, though it is possibly less untrue about certain classes of specialists than about other practitioners. Most doctors here would also regard the following statement as libellous :

" The doctor must be on the safe side. He wants hospital treatment for the patient because he thinks that he is going to die. Every death is talked about by the neighbours and counts against him, but if the death occurs in the hands of hospital physicians no one can blame him. He must avoid blame at almost any cost. How else can he live? Patients will not come to him if they often hear him blamed. Because of his need for safety first it is hard to make a doctor commit himself about anything in which he may later be shown wrong. He is apt to hedge or to be vague at a time when clear-cut statements are needed."

It is possible, of course, that such statements as these may throw an interesting sidelight upon some aspects of medical practice in certain parts of the United States. And, in spite of the imperfections of thought, and of knowledge of medical conduct in this country, which they indicate, there is much in the remainder of the volume, the main portion of it, which may be commended and will certainly be found suggestive and helpful by many of those who care for the sick, especially by clergy and ministers whose pastoral duties impose upon them a

[4] *The Art of Ministering to the Sick.* By Richard C. Cabot, M.D., and Russell L. Dicks, B.D. New York: The Macmillan Company ; London: Macmillan and Co. Ltd. 1936. (Pp. 384. 12s. 6d. net.)

special responsibility. Practical hints, though they may be thought by some to tend to reduce spiritual sympathy and encouragement to a kind of mechanism, will be found scattered throughout ; and there are admirable essays on " Listening," " Quietness," " Prayer," " Scripture," in the chapters so headed. They contain, among other things, an admirable selection of Biblical passages and some beautiful forms of prayer for various circumstances and occasions. The two chapters on " The Dying " and " The Bereaved," with which the main body of the book ends, are also very wise, and should be of great service.

ESSENTIALS OF CARDIOGRAPHY

In his little manual with this title[5] Dr. H. B. RUSSELL has sketched the elementary principles of electrocardiography and the radiology of the heart and aorta. He has purposely omitted consideration of the more complex forms of electrocardiogram and even some of the everyday manœuvres in fluoroscopy, such as the use of barium in outlining the posterior surface of the heart. The fundamental principles underlying the cardiographic methods have been clearly laid down, and these pages will be found useful by those to whom they are addressed—namely, medical students. But it is difficult to avoid the reflection that special branches of special departments of medicine can scarcely be epitomized profitably, and that cardiography is not a subject that lends itself to broad outlines. It may be true that a passing knowledge of, for example, electrocardiograms should be part of every practitioner's equipment, but it is quite certain that the record may be valueless and even misleading unless it is being considered by, or is accompanied by a report from, someone who deals with them constantly and in large numbers. The same holds good for skiagrams of the heart and aorta. The present work has been attractively produced, and the text is accompanied by good reproductions of electrocardiograms and orthodiagrams.

Notes on Books

Dr. EMSLIE HUTTON writes in a simple style directly for women approaching the change of life.[6] Her object is " to replace all the traditional fallacies with anatomical and physiological facts." The climacteric, she states, " takes place when a woman is at her prime ; the only result is that she becomes barren." The subject is approached through an informative chapter on menstruation, including a plea for instruction before puberty, since a happy attitude to the monthly period tends to ensure its peaceable close. The climacteric is described well and reassuringly ; one in four women suffer from no symptoms. Its disorders are efficiently dealt with, some being " not enumerated lest they be suggested to imaginative women." The advice about mastitis and malignant disease seems particularly well balanced. Advertised drugs, crystal-gazing, and emotional entertainments are condemned. Simple hygiene, not medical treatment, is taught. Methods of combating obesity are given in detail, chiefly diets and exercises, swimming being favoured. Perhaps a reference to the popular health and beauty associations, eurhythmics, and " keep fit " classes might have been introduced here. " Advice to Husbands " consists chiefly in an appeal for sympathy. The closing chapter offers the hope of increasing mental and spiritual growth after the climacteric. Certainly a reliable, pleasant, and handy little book for the ordinarily intelligent woman patient.

[5] *Essentials of Cardiography*. By H. B. Russell, M.D., M.R.C.P. London: J. and A. Churchill Ltd. 1936. (Pp. 82 ; 73 figures. 7s. 6d.)

[6] *The Hygiene of the Change in Women (The Climacteric)*. By Isabel Emslie Hutton, M.D. London: William Heinemann (Medical Books) Ltd. 1936. (Pp. 110. 5s. net.)

DR. STELLA CHURCHILL is a writer of experience, having a public with whom she is well acquainted. This time she addresses mothers.[7] Beginning with the anatomy of the male and female genital apparatus and the reproductive process, which is described in simple terms, Dr. Churchill goes on to give advice about health in maternity, on practical motherhood, rearing and educating children, their adolescence, and the mother's own middle age. The recommendations as to pre-nuptial examination and information, the strictures on certain types of private school, and especially the pervading advice on the mother's psychological relationship to son or daughter, are noteworthy. Professor James Young writes a foreword commending the remarks on maternity, and an excellent bibliography is provided at the end. The writing is pleasant, if not scientific, conveying much practical wisdom. The volume is easy to handle. There are delightful quotations as chapter headings. In the preface Dr. Churchill speaks of the book as to some extent a defence of mothers. " All parents are fools, especially mothers," she quotes. She succeeds to the extent of making the reader exclaim " At least it is no fool who has written this book!"

[7] *On Being a Mother*. By Stella Churchill, M.R.C.S., L.R.C.P., D.P.H. London: Victor Gollancz Ltd. 1936. (Pp. 285. 7s. 6d. net.)

Preparations and Appliances

MAGNETIC SPECTACLES FOR PTOSIS

Dr. CHARLES RUSS (London, W.1) writes:

The condition of ptosis, whether partial or complete, is one which handicaps the patient either in sight or in appearance. I believe the problem of relieving ptosis is to keep the eyelid raised enough for good sight without any conscious effort of the patient, while permitting blinking without having to remove the appliance used ; most adults blink at least twice a minute, which means 1,920 times in the sixteen hours of conscious workaday life. If we mount a special shaped magnet in a spectacle frame and attach a small bar of steel (armature) to the palsied eyelid, the latter must rise to the poles of the magnet above it, and in so doing will raise the eyelid ; moreover, the adhesion of the armature to the poles will keep the eyelid open until the need is felt to blink. When the strength of pull of the poles on the armature is correctly adjusted the orbicularis muscle can overcome that adherence and pull the eyelid down. Then the orbicularis muscle will relax and the magnet will raise the eyelid again. When the patient removes the magnetic spectacles for sleep the eyelid will, of course, close.

A permanent magnet made of the latest alloys allows stronger magnetism to be imparted to steel than was formerly the case, is not too large or clumsy to be fixed between the eye and the lens of the spectacle, and will retain its strength for several years if provided with a keeper-bar. A counterpoise of the same weight as the magnet has to be placed in the eye rim of the sound eye in order to keep the balance even on the bridge of the nose. Of course, when dealing with double ptosis one would place a magnet in each rim of the magnetic spectacles.

The armature is fixed to the eyelid by means of adhesive plaster, which can be renewed every few days, although it may be that some ptosis patients would prefer to have the armature buried under the skin of the eyelid by a small surgical operation, especially if their ptosis is likely to be permanent. The magnet should be mounted in the frame with adjustment fittings in two planes, or possibly three, and besides a lens, which will probably be wanted, there may be some dark tinting required for the photophobia, if the eye has long been unaccustomed to light. There are, of course, varying degrees of ptosis in adults or in children, and the use of magnetic spectacles may be of service either for restoration of sight—in an eye with good vision—or its improvement by better uncovering of the pupil. If the subject of ptosis has no faulty vision the magnetic spectacles might be used to improve the person's appearance—only if their aspect were less odd with the spectacles than without them. The magnetic spectacles are made by Messrs. Clement Clarke, Ltd., of 16, Wigmore Street, W.1.

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THE DISCIPLINE OF CLINICAL MEDICINE

General Smuts has conveniently summarized a prevalent philosophic tendency in the word "holism." The same tendency is expressed in Adler's "individual psychology." Under the title of "The Discipline of Clinical Medicine" Dr. F. M. R. Walshe has applied the principle not to a branch but to the whole of medicine.[1] The occasion of his lecture added point to his already pungent arguments, for it was delivered before the students of the Cambridge University Medical Society, surrounded by laboratories where of necessity the analytic, rigidly controlled experimental method prevails. By no means overawed by these frowning fortresses of the "fundamental" sciences, he carried his flag into the heart of their country, treating "science for the sake of science" as a slogan as outmoded as "art for art's sake."

Belligerence apart, there was much in his lecture of a constructive sort, helpful not only to general practitioners in the making, but also to hospital physicians, who are apt to be browbeaten into a feeling of inferiority by exponents of "pure" science. All clinical teachers know the bewilderment which the student emerging from the study of anatomy and physiology experiences on entering the crowded out-patient department of a large hospital. He feels, as Dr. Walshe says, that "he has entered a world where facts seem no longer the masters of the situation, a world in which an arbitrary selection of unverified and often fantastic details has become the accepted substitute for controlled observation and logical inference." But then "he begins to feel that there is scope for his judgement, and something to sharpen his wits on." The difficulty is usually greater in those who have served the longest apprenticeship to the biological sciences. "They have been taught to tidy up reality by cutting it up into convenient bits and dealing with each bit separately. But now they have to take reality in uncouth lumps and to grapple with nature's incredibly dirty and complex experiments. They cannot always measure, they cannot verify, they are thrown back upon their judgement, and this has never been trained."

The application of the rules of clinical medicine is a matter of trained judgement, but it necessarily rests upon careful observation and is therefore a logical process. The practical clinician has to learn to recognize states of disease by something less than a complete study and inventory of all its components; for he has to deal with urgent human needs. What Dr. Walshe is not prepared to admit is that this essentially synthetic task is so different from the analytic method of the scientist that it must necessarily unfit the clinician for scientific investigation. There is an art and a science of medicine each with their distinct methods, and while he agrees that a man busily engaged in the practical art may be ill placed to engage also in scientific research, he maintains that there is nothing in the nature of things to unfit him to undertake both, as has been asserted. He illustrates this contention by Babinski's discovery and explanation of the extensor response, which added to physiological knowledge by extending Sherrington's observation to the human subject, which no one but the clinician could have done, for with him rests the last step in the application of knowledge derived from animal experiment. Sir Archibald Garrod wrote of the debt of science to medicine, and this is no paradox. The first intimations of the functions of the thyroid, pituitary, and adrenals came from the bedside. Empiricism has often won therapeutic success which had to wait long for scientific explanation. Yet the empirical method has always been suspect by the laboratory, though it is a procedure by trial and error just as the experimental method is; we might add, unfairly suspect when one remembers that cod-liver oil was used for many years, to the scorn of the experimentalist, until vitamins were discovered and he scoffed no more.

We have, however, two criticisms to make on Dr. Walshe's vigorous and entertaining polemic. Starling maintained that no branch of science, faithfully followed for its own sake, failed eventually to throw light on practical problems—of which Gaskell's work on the heart and the sympathetic nervous system is an outstanding example. And Starling, though a stalwart of the laboratory, always recognized that the deliberately simplified conditions of experiment could not be safely applied to clinical work without correction. Knowing the moves in chess, he would say, did not of itself make one a good chess player. He instanced the extraordinary checks and counter-checks in the regulation of blood pressure in health and disease which reduce much of its mechanical investigation in the laboratory to a mockery. This illustrates a type of mind in the pure scientist which is less uncommon than Dr. Walshe seems to have found it, and we think that an increasing number of them are realizing that the laboratory is not enough. Certainly, in the various discussions on the reform of the curriculum, the anatomist and physiologist appeared to welcome the illustration of the principles they wished to inculcate by the demonstration of patients.

We agree, however, that anyone who tries to build a wall between the laboratory worker and the clinician

[1] *University College Hospital Magazine*, March–April, 1936.

does a singular disservice to both, and that clinical science, as Sir Thomas Lewis has forcibly maintained, has a status of its own, equivalent to those of other sciences. And we find ourselves in cordial agreement with the lecturer's closing remarks. What does the discipline of medicine offer to those who submit themselves to it? The practice of an art which makes the fullest demands upon both intelligence and character; the common sense that it confers on those who follow it unselfishly, which is a valuable asset to any scientific investigator; the fullest scope for the man bent on scientific research. Finally, apart altogether from these rich and varied intellectual satisfactions, it offers those satisfactions to the soul which the physician may enjoy as the servant of the community and those contacts with his fellow-men which no other occupation offers in like measure. "Science for the sake of science" is a cold, dehumanized ideal that cannot for long satisfy the aspirations of the complete man. "In short, who follows medicine embarks upon a noble adventure and need not bow before anyone—in the house of science or elsewhere."

ACETYLCHOLINE: SOME RECENT WORK

The theory of humoral transmission of the nerve impulse in the autonomic nervous system is now firmly established, and autonomic nerves are divided into cholinergic and adrenergic according as the chemical transmitter is acetylcholine or sympathin. The identity of the latter substance with adrenaline has not been finally proved. Detection of acetylcholine depends upon the following tests: it is unstable in alkaline solution but relatively stable in acid; it is inactivated by the esterase present in blood and protected from the action of this enzyme by a minute dose of eserine; it is a powerful vaso-dilator; it is a stimulant to parasympathetic nerve endings, an effect which is abolished by atropine; it produces characteristic contractures of certain voluntary muscles; and in particular it can be detected in minute doses by its action on the eserinized leech muscle.

By these methods it has been shown that acetylcholine is liberated at parasympathetic endings on stimulation of nerves of this system, at sympathetic ganglia on stimulation of preganglionic fibres, and in a variety of other circumstances. The question arises whether this substance is also involved in the transmission of impulses from the higher centres and in the transmission of the impulse from a motor nerve to the effector voluntary muscle. Henderson and Wilson[1] found that relatively minute doses of acetylcholine injected directly into the ventricles produced a more or less characteristic train of symptoms which might reasonably be attributed to a stimulus in the cerebral centres controlling peripheral cholinergic nerves. Briefly, these symptoms were vomiting and peristalsis, and, in many cases, sweating; but there was no significant change produced in blood pressure or pulse rate, nor were there respiratory or pupillary effects. The doses used were quite ineffective intravenously. The usual criteria of direct acetylcholine action were applied and found to obtain. Further, it was observed that intraventricular eserine in adequate dosage led to a similar train of symptoms, and the conclusion is drawn that this is due to an inhibition of the choline-esterase in the cerebral substance with the resulting liberation of acetylcholine. This is supported by the facts that sub-threshold doses of acetylcholine could be made to stimulate if a preliminary small dose of eserine were injected into the ventricles, and that a subject with unusual resistance to the former could be made normally responsive by a preliminary small injection of the latter. In addition, the train of symptoms could be inhibited by intraventricular atropine. Although this work strongly suggests that there is a liberation of acetylcholine at synapses in the central nervous system, anything like a direct demonstration has not yet been made.

The careful argument and experiment necessary before the participation of acetylcholine in any physiological process is accepted is well illustrated in the recent publication by Dale and his co-workers[2] on the release of acetylcholine at voluntary nerve endings. In this work, carried out on animals, it was necessary to eliminate the possible complications due to sensory and sympathetic fibres, and to prevent any action of blood esterase. Muscles were perfused with oxygenated Locke's solution containing eserine until the effluent from the veins was free from blood. The effluent was tested for acetylcholine before and after electrical stimulation of the nerve, the preparation upon which most reliance was placed being the eserinized leech muscle. The results left little doubt that stimulation of the motor nerves to perfused voluntary muscle causes the appearance of acetylcholine in the venous fluid. Complete denervation of the muscles prevents the appearance of acetylcholine normally produced on direct stimulation. That this appearance is not due to muscular contraction as such was revealed by using curarine to prevent the passage of the nerve impulse when acetylcholine could still be demonstrated in the venous effluent. The interpretation of the function of the acetylcholine thus shown to be liberated at motor nerve endings is not yet clear. The alternatives suggested by Dale and his colleagues are that either acetylcholine acts as a sensitizer for the effector cell (that is, shortens the chronaxie of the nerve cell or motor end-plate so that it is momentarily attuned to that of the nerve itself), or that acetylcholine acts as a direct stimulant of the nerve cell or motor end-plate (that is, a process analogous to that considered to occur at ganglionic synapses). These workers favour the latter hypothesis, but state that further work is needed to establish it.

[1] *Quart. Journ. Exper. Phys.*, 1936, xxvi, No. 1, p. 83.

[2] *Journ. of Physiol.*, 1936, lxxxvi, 353.

NUTRITIONAL REQUIREMENTS AND EVOLUTION OF BACTERIA

Knowledge of the nutrition of bacteria in general is meagre and scattered ; without some co-ordinating theory it remains a series of undigested facts. Mr. Knight, in a monograph on bacterial nutrition,[1] has aimed at collecting and systematizing the available observations, and at unifying them on the basis of a consistent theory. These observations are described in the first part of his report in considerable detail ; in the second part he discusses their co-ordination ; and in the third part the mechanism of nutritional variation. Four stages in the increasing complexity of nutrient requirements are recognized. In the first stage, carbon is assimilated as CO_2, and nitrogen is taken from inorganic sources, particularly ammonia, the energy needed for this process being derived from the oxidation of simple inorganic compounds or from radiant and chemical energy. In the fourth stage, energy and carbon compounds for assimilation are derived from the utilization of carbon compounds more reduced than CO_2 ; nitrogen assimilation is effected from an array of amino-acids, and accessory growth substances are also required. Mr. Knight regards this classification—according to increasing complexity of requirements—not merely as a method of systematizing existing knowledge, but also as an expression of the course of bacterial evolution. He supposes that the earliest bacteria arose under primitive conditions when only the simpler compounds were available for nutrition, and that bacteria with more complex nutritional needs have lost the power to synthesize compounds essential to their metabolism as these have become available in their environment. This theory does not account for the appearance of the complex machinery necessary for the processes of the first stage. It might be equally justifiable to assume that bacteria first arose under special local conditions where more complex substances were available. Nevertheless there is little difficulty in accepting the view that the need for certain amino-acids results from the loss of the ability to synthesize them, since amino-acids are essential components of living matter. This view is supported by the occurrence of two types of strain in the same species —for example, *B. typhosum*—one of which requires amino-acids while the other can assimilate nitrogen from ammonia. It may be more difficult to accept the suggestion that the special factors required by certain bacteria are essential to the metabolism of bacteria generally, and are synthesized by those which do not require them in their food. This theory is, however, consistent with the lack of specificity of the sporogenes factor, which is required also by *Cl. botulinum* and *Cl. welchii*. It would be difficult to understand why these three organisms should have developed the need for this one factor. The view is also supported by the fact that the sporogenes factor is synthesized by bacteria of lower nutritional levels. The loss of synthetic ability so far as nutrition is concerned may be accompanied by the development of other new and increased powers, among them the power to attack living cells characteristic of pathogenic organisms. Hence the complexity of the nutritional requirements of pathogenic bacteria. A good example of the parallelism between pathogenicity and nutritional requirements is afforded by the acid-fast bacilli. On the one hand *Myco. phlei*, which is not pathogenic, can use ammonia and simple carbon compounds ; at the other extreme, Johne's bacillus requires growth factors besides amino-acids and complex compounds.

[1] Bacterial Nutrition. Material for a Comparative Physiology of Bacteria. Medical Research Council, Special Report, No. 210. London: H.M. Stationery Office. 1936. (3s.)

INTRAPLEURAL SURGERY IN PHTHISIS

In the treatment of pulmonary tuberculosis surgical procedures, other than those aiming at obtaining collapse of the lung, have hardly entered the realm of practical medicine, although pioneer work on the subject is being carried on abroad. Thus at the Annual Meeting at Oxford this year the combined Sections of Medicine and Surgery, in discussing the surgery of pulmonary tuberculosis, while they recognized the advances made in intrapleural operations, confined their discussion almost exclusively to the more orthodox surgical procedures for producing collapse of the lung by extrapleural methods (page 349). In a recent paper[1] Robert Monod reviews succinctly the various intrapleural operations that have been attempted so far in the treatment of phthisis, and draws certain conclusions as to their value and probable future developments. He maintains that these methods, while in no way supplanting the recognized extrapleural measures, should not be ignored. They occasionally make it possible for the medical attendant to get out of a " therapeutic blind alley " when other methods cannot be used ; and, moreover, the application of modern principles has made endothoracic surgery almost as safe as abdominal surgery. Monod dismisses the objection—the general systemic character of the disease—which has been raised on biological grounds to the intrapleural operations, an objection that is in any case equally applicable to major collapse surgery. The indirect intrapleural operations consist of ligaturing pulmonary vessels and of adhesion section after opening the thorax. Ligature of branches of the pulmonary artery is thought to produce an infarct and subsequent diminution in the volume of the lobe with a dense fibrous reaction. But the technique is difficult, the profuse anastomosis between the bronchial and pulmonary vessels may prevent the achievement of the desired effect, and there always exists the danger of secondary infection. On the other hand, ligature of the pulmonary vein to produce passive congestion (on the principle of Bier's hyperaemia), as introduced by Edel and Kerschner in 1931, is a comparatively simple operation, and appears to have a future in the treatment of early cases of phthisis. Direct adhesion section by opening the thoracic cavity is a method to be considered when the endoscopic technique fails. Direct drainage of tuberculous cavities has been carried out and might be employed with advantage in the " giant type " when such cavities cannot be dealt with by thoracoplasty, or when the latter has failed to effect a cure. Sauerbruch has actually succeeded in saving a patient's life by opening a cavity immediately on the occurrence of a large haemoptysis and tying the bleeding vessel. Direct drainage may also be useful in the case of a

[1] *Bull. de l'Acad. de Méd.*, June 30th, 1936, p. 933.

tuberculous cavity secondarily infected, when it really becomes equivalent to a pulmonary abscess. Finally, Monod discusses the use of lobectomy and pneumonectomy, summarizes their indications, and describes cases of phthisis which have been so treated.

MEDICAL RESEARCH IN MALAYA

The annual report of the Institute for Medical Research at Kuala Lumpur, Federated Malay States, covers a wide range of activities. Unfortunately the work of the Institute has been greatly hampered by lack of funds, and estimates for annual expenditure are actually 60 per cent. below those of 1930. Considerable research has been devoted to the viruses of "rural" tropical typhus and Japanese river fever, and investigation of insect vectors of the local typhus-like fevers has definitely incriminated the rat flea, *X. cheopis*. With regard to malaria, the effect of atebrin was compared with that of short courses of quinine (20 grains a day), in large-scale experiments on the labourers on rubber estates; the results did not justify the increased expenditure called for by the employment of atebrin. Trapping of mosquitos was practised on one estate by means of a human bait mosquito-net trap. In another area more than 4,000 anophelines, including eleven different species, were dissected; one species, *A. separatus*, was recorded as a local malaria carrier for the first time. Turning to the routine work, the measures for combating rabies are of considerable interest. Mass inoculation of dogs with canine anti-rabies vaccine was carried out for the third year in succession in the Kuala Lumpur area, and, as in the previous year, no cases of canine rabies were reported. Human anti-rabies vaccine was prepared and issued to various treatment centres in other areas, and of forty-five people bitten all recovered. The Institute also prepares its own vaccination lymph for small-pox, issuing 57,000 tubes during the year under review.

PORADENITIS VENEREA

Under this title we reviewed last year the recent literature of a disease that goes by a number of names. Poradenitis venerea was suggested by Stannus, to whose enterprise the recognition of the disease in this country is largely due; it is descriptive of the essential lesion wherever it may occur, and is therefore more suitable than the commonly employed "lymphogranuloma inguinale," which has the damning disadvantage of referring only to the ordinary manifestation of the disease in the male sex, regardless of the fact that in the female its consequences are, for anatomical reasons, totally different. How confused is the terminology of this interesting subject may be gathered from the fact that different names for the disease are used in two consecutive papers in the same journal—Thompson,[1] in an excellent general review, referring to it as "lymphopathia venereum," and David and Loring[2] as "lymphogranuloma inguinale." These authors have had the opportunity of studying a large number of patients the majority of whom were negroes, and they elucidate a point which has remained somewhat obscure in the general clarification of this subject witnessed in the past ten years. The essential lesion is suppuration with subsequent fibrosis of lymphatic glands draining the portal of entry; this process takes place in the inguinal glands in the male and in the pelvic glands in the female, ultimately causing rectal stricture. For the occurrence of rectal stricture in the male, however, there has been hitherto no satisfactory explanation, and David and Loring confirm a suspicion which has been expressed before by referring to eight such patients all of whom had practised sodomy. They also describe a case in which cervical glands were involved with a primary lesion in the mouth. Another observation of interest has been made by von Haam and d'Aunoy,[3] who were concerned to prove that the infection is not limited to the obviously affected glands, but may even be generalized. The presence of the virus can be demonstrated by the intracerebral inoculation of mice, and these investigators obtained positive results by this method with cerebro-spinal fluid from patients in an early stage with constitutional symptoms. When a greater interest in this disease has been aroused in this country, we may know whether the very few indigenous cases that have been reported are a reliable index of its incidence here. If every case of inguinal bubo and every case of rectal stricture not clearly due to some other cause were submitted to the Frei test, which all authors are agreed is absolutely diagnostic, it might be found that we are not as exempt as has been supposed.

[1] *Journ. Amer. Med. Assoc.*, 1936, cvi, 1869.
[2] Ibid., p. 1875.

HYDATID OF THE SPLEEN

After absorption from the alimentary tract the hexacanth embryo of hydatid disease passes by the portal vein to the liver. It thus has to traverse the reticulations of the liver and lungs before reaching the systemic circulation. The hepatic filter retains about 75 per cent. and the pulmonary filter-bed another 10 per cent. Of the remainder a considerable proportion are caught and develop in the spleen. Of minor importance but of no little pathological interest are cases of secondary hydatid of the spleen, occurring by embolism from cysts in the heart or spread from peritoneal invasion. Though of comparative rarity, Dr. Sabadini has been able to collect with his own observations 288 cases of hydatid of the spleen,[4] after surveying the literature published since 1790. Hydatid invasion of the spleen may be entirely latent, insidious, and progressive. In some cases pain occurs, at times severe enough to cause confusion with gastric crises of tabes in syphilitics. The attacks of pain are intermittent and often accompanied by inability to lie on the left side, a sign first described by Trinkler. Sooner or later there is a tumour, which is always limited to the left side of the abdomen, and which causes symptoms of pressure in the abdomen or in the chest according to the direction of growth. Complications arise from continued growth, infection, rupture, or adhesions to neighbouring viscera. The author thinks little of laboratory aids to diagnosis, classing the complement-fixation test and intradermal reaction of Casoni as of the same degree of usefulness as eosinophilia of 4 to 10 per cent. in the blood. Workers in other parts of the world have assured themselves of the great diagnostic value of these specific

[3] Ibid., p. 1642.
[4] *Les Kystes Hydatiques de la Rate*. By L. Sabadini. Paris: Masson et Cie. 1936. (32 fr.)

immunity tests, and have taught their surgical colleagues to place much reliance on them. *X* rays are also a valuable diagnostic aid. In regard to treatment, Sabadini rightly dismisses puncture as technically wrong and even dangerous, not only on account of the risk of severe anaphylactic symptoms but of the added danger of peritoneal dissemination and infection. An open operation with exposure of the cyst, injection of 1 per cent. formalin, evacuation, and marsupialization is the method of choice. Splenectomy is sometimes required, but there is greater operative risk in this procedure. Details of operations are well described and illustrated. Sabadini's monograph is a useful contribution to a subject of which clinicians should be aware even in countries where hydatid disease is not endemic. Cases are reported in the journals in this country from time to time, and the proper method of treatment is now established and should be known. A good bibliography is appended, but no mention is made of the full survey of hydatid, particularly as it occurs in Australia, published by Dew in 1928.

ESTIMATION OF COMFORT CONDITIONS

In a report of the Industrial Health Research Board[1] Dr. T. Bedford describes a most elaborate and exhaustive investigation on the atmospheric conditions conducive to a feeling of comfortable warmth in persons engaged on light sedentary work during the winter months. Most of the 2,000 subjects investigated were women and girls working in factories, but the data would apply almost equally to persons in offices and similar buildings. The twelve factories investigated were warmed and ventilated in a number of different ways, and in some of them there was a good deal of radiant heating. During the last twenty years various instruments have been devised for measuring atmospheric conditions, but none of them responds to all the four atmospheric conditions which influence comfort—namely, air temperature, air movement, humidity, and radiation. Dr. Bedford's chief aim was to determine how far these instruments fall short of theoretical requirements, and to suggest, if possible, the perfect instrument. His measurements were made with reference to the degree of comfortable warmth experienced by his subjects, and he found that readings of the eupatheoscope (a large cylinder having its blackened surface heated electrically to about 75°) showed the best correspondence, while the globe thermometer (an unheated blackened copper globe 6 inches in diameter) came very close to it. The effective temperature scale introduced by American physiologists (which takes account of humidity but not of radiant heat) was no better than the ordinary dry bulb temperature, while the kata-thermometer, though a good instrument for estimating the "freshness" of the air, gave rather a poor result as an indicator of comfort. Observations made on the surface temperature of the clothed body of a number of subjects at various atmospheric temperatures showed that it is very responsive, for it rose about 0.7° for each rise of 1° in air temperature. Somewhat unexpectedly the exposed skin of the body proved to be less affected by changes of air temperature than the clothed body, for it was found that, on an average, the temperature of the forehead rose only 0.14° for each rise of 1° in the air, while that of the hand rose 0.46°. However, the foot temperature rose 0.8°, and therefore showed itself to be specially sensitive to cool air at floor level. Complaints of cold feet and draughts were fairly numerous, but it appeared that they were mostly due to the sensitiveness of the objectors to lack of warmth in general. It appeared that "comfort" is experienced under such a wide range of temperature conditions that it is quite impossible to please everybody. All one can do is to choose the conditions giving the greatest comfort to the greatest number. These conditions corresponded to an air temperature of about 65°, or to a correspondingly lower temperature if the walls or other objects in the room were radiating heat. It is impossible, in the limits of a brief summary, to give more than the barest outline of this very thorough investigation, in which all the observational data have been subjected to the strictest statistical analysis. Dr. Bedford is to be warmly congratulated on reaching such a high level of achievement.

[1] Medical Research Council. Report No. 76. The Warmth Factor in Comfort at Work. A Physiological Study of Heating and Ventilation. By T. Bedford. London: H.M. Stationery Office. 1936. (2s. net.)

"BULLETIN DE L'INSTITUT METCHNIKOFF"

The first number of the new scientific journal with this title—the official organ of the Metchnikoff Institute, Karvov, U.S.S.R.—appeared in April last. One gathers from the preface that the object of this Bulletin is to make known to doctors and laboratory workers the results of scientific investigations pursued at the Metchnikoff Institute. The editorial board consists of Professor Besredka and Dr. Ramon of the Pasteur Institute, Paris, together with the director and assistant director of the Metchnikoff Institute, Dr. Menlik and Dr. Tzekhnovitzer, and its policy apparently is to accept only short papers limited to four pages of print and shorn of much technical detail and superfluous illustrations. These papers may be in French, English, or German, and must be devoted to original work not previously published in any one of the official languages. The first number contains nineteen papers dealing with a variety of subjects—allergy and immunity in tuberculosis, prophylaxis and treatment of dysentery by the bacteriophage, the bacteriological diagnosis of whooping-cough, antivirus in the prevention and treatment of gas gangrene, the properties of vaccine virus grown in yeast, and the diagnosis of gas gangrene by means of a precipitin test are some of them. Of course it is extremely difficult to judge the value of the work from short papers such as these ; the detailed evidence is essential for this purpose. But they give an indication of the very considerable activity of the staff of the Metchnikoff Institute, who are obviously alive to the problems of immediate practical importance. This Bulletin should serve a most useful purpose in bringing the work of the Metchnikoff Institute to the notice of those engaged in bacteriological research in other parts of the world. It is to appear monthly—with the exception of the three holiday months—and can be obtained in this country through W. H. Smith and Son, Ltd., Strand House, W.C.2.

TREATMENT IN GENERAL PRACTICE

This article is one of a series on the management of some of the metabolic diseases met with in general practice. The first group of articles on Treatment in General Practice, thirty-five in number, was republished in book form last March by H. K. Lewis & Co., and a second volume will appear in the autumn.

THE TREATMENT OF OBESITY

BY

A. H. DOUTHWAITE, M.D., F.R.C.P.

The accumulation of excess of fat, in that it always tends to reduce physical efficiency and not uncommonly to imperil life, should be regarded far more gravely than is generally the case. Now although there are a considerable number of different causes of undue rotundity, yet in practice the majority of cases result from excessive food intake, and deserve, therefore, our chief attention. Thus most people over the age of 40 are too fat, although at first glance they might be passed as normal. Fat creeps insidiously into the abdominal wall and the enclosed viscera, producing the middle-age spread as its first sign. At this stage treatment is a simple matter and unassociated with any danger. It may consist of either exercises or reduced food intake, or preferably both.

Most exercises advised for fat people are almost useless, and in many cases very wasteful of physical effort for the result achieved. Thus the contortions made familiar to us from our young days by the gymnasium instructor often produce powerful biceps, a deep chest, and strong abdominal recti. They leave out of account entirely the importance of the oblique muscles of the abdomen and the quadratus lumborum. It is the weakening of these muscles, however, which is responsible for the loss of waist line, pendulous belly, and constipation of those possessed of a redundant paunch. Another objection to current bathroom exercises is that they can be practised only in strict privacy, for their employment in the street would inevitably lead to an observation cell.

Suitable Exercises

What, then, are the exercises which we should advise? In the first place, they must involve all the main muscles of the abdominal wall and pelvic floor. Secondly, it should be possible to carry out some of them, at any rate, *during working hours* without attracting undue attention. In my opinion those described by Hornibrook in *The Culture of the Abdomen* are far and away the best. This book is a better prescription for abdominal obesity, and for that matter for constipation, than any drug or combination of drugs. The principle is this: the abdominal muscles can be contracted and relaxed at will without causing gross movements of the trunk. The viscera, however, are thus kept in healthy turbulence, and fat deposits over and in these muscles steadily disappear. The action is much the same as that which produces contraction of the quadriceps femoris without accompanying extension of the knee-joint.

First, the patient should be taught to pull his abdominal wall in and out while standing and while sitting. This activates the recti chiefly, but also to some extent the obliques. Secondly, he should learn to exercise the obliques and quadratus lumborum by standing and drawing the hips and lower ribs together, first on one side then on the other. This is more difficult to learn and at first involves more movement, but in time the action can be mastered so that the lateral and posterior abdominal muscles are alternately contracted and relaxed with but little motion of the trunk. Again, they can be carried out eventually in a sitting posture. The patient should be taught to appreciate what is happening by placing his finger-tips over the muscles to be exercised. By this means he will grasp the scheme much more quickly and carry it out more efficiently. Thirdly, the pelvic floor should be exercised by alternately drawing up and relaxing the anus. As a sharp contraction of the relevant muscles takes place in both sexes at the end of defaecation and of micturition it can be explained in this way without difficulty. The reason for these exercises is that the pelvic floor is usually weakened in the obese and tends to the production of incontinence of urine in the female, constipation, rectal prolapse, and piles.

Lastly, the back must not be forgotten. All fat people eventually develop a bad stance, and a healthy abdominal wall cannot be achieved if its main point of attachment is weak and warped. Insistence should thus be placed on the importance of carrying the head and body erect as a positive means to the desired goal. Now although many other excellent exercises have been devised, yet only those described above can easily be carried out from time to time during the day. The muscular contractions can be performed while the patient is travelling, while waiting for a bus, sitting at a desk, and even at the dinner table, without exciting comment. The great secret of successful exercises is that they should be capable of being performed at frequent intervals until they become a habit. This is obviously of far greater value than a quarter of an hour's intense boredom of "bedroom jerks."

Effective as the abdominal contractions are they in no way exhaust the patient, and can thus be carried out by the fattest person, who would be rendered gravely ill by attempting any of the more common violent exercises. When should these exercises be advised? Clearly, to all fat people. But particularly one should use one's opportunity as a doctor to catch the disease at its inception. The complacency with which the middle-aged accept increasing girth is deplorable, and only their doctor can warn them of the danger without the risk of incurring their displeasure.

For those also afflicted with fat arms and neck the same principle of static muscular contractions can be applied. It is noteworthy that fat will not accumulate over a muscle which is frequently used. Observe, for instance, the well-shaped legs of the fattest glutton who has not yet settled down to the almost perpetual recumbency of an over-replete boa-constrictor. The great muscle of eating—namely, the masseter—is a remarkable exception to this rule.

What to Eat

Whereas most people have themselves to blame for the fat which encumbers them, one must admit a large element of bad luck (if such a term may be pardoned) in many. This refers, of course, to an inherited predisposition to fatness. Such people may eat small meals and yet put on weight. Others of lean stock may be possessed of the grossest appetites and yet escape unscathed. The explanation of this is not clear. It may be a matter of complete absorption of foodstuffs in the one and

incomplete absorption, possibly occasioned by rapid transit, in the other. Yet again, glandular deficiency may play a part. However, though the problem is interesting, it does not appreciably affect the nature of the treatment. In these persons a strict dietetic regime is essential, as also in the obviously gluttonous. For all but the most obstinate cases the following dietary (modified from *Obesity* by Leonard Williams) will prove amply sufficient. Weight is lost at the rate of about three to four pounds a week.

On Waking.—A glass of water, Vichy water, or a cup of tea with a teaspoonful of milk or a slice of lemon. Saccharin if required.

Breakfast.—Tea or coffee with two teaspoonfuls of milk. Saccharin. Sole or haddock, or a boiled or poached egg. One slice of dry toast Grape-fruit (no sugar), orange, or apple.

Luncheon.—A glass of water, 4 oz. of chicken, or tongue, or beef: no gravy. Vegetables, fresh or boiled, as given below. One slice of toast thinly spread with butter. Fresh fruit, except banana, grapes, and currants.

Tea.—Tea with lemon and saccharin (if required).

Dinner.—A glass of water. Meat soup skimmed of fat. Fish. 2 to 3 oz. of game or lean meat (except pork). Vegetables, as below. One slice of brown bread. Fresh fruit, as at luncheon. Black coffee.

Vegetables Allowed.—Green vegetables (except peas), celery, seakale, asparagus, salsify, and artichoke leaves.

Condiments Allowed.—Worcester and anchovy sauces, pepper, mustard, vinegar, horse-radish, salt (see later).

Alcohol Allowed.—A tablespoonful of whisky a day or a wineglass of dry Hock or Moselle.

No food of any sort must be taken between meals or at bedtime.

It is popularly supposed that drinking with food increases the tendency to put on fat. There is an element of truth in this. Apart from the rare cases of obesity due to water retention, in which the total fluid intake must be restricted, it is unnecessary to limit the amount of water taken by fat people. The reason why drinking with meals may aggravate obesity is that by washing down the food it encourages further excess. On a standard dietary such as that mentioned no difference is observed as the result of taking fluid before or with food.

Drug Therapy

Many popular saline purgatives are lauded for their weight-reducing properties. In most cases of obesity their only action is to hurry food through the intestinal tract and thus reduce the total absorption. It is, in short, a method of taking away with one hand that which has been given with the other. As free purgation is very deleterious to the health the method has nothing to recommend it.

The administration of thyroid gland is the only mode of glandular therapy as yet worthy of serious consideration. Theoretically thyroid should be prescribed only for those suffering from thyroid deficiency. In general this is a good rule to which to adhere, but owing to the fact that even in the normal person thyroid administration will produce some loss of weight its use must not be absolutely condemned provided that it is given with circumspection. The initial and limited loss of weight in healthy persons is due to increased water excretion. In people fat from any cause this is more marked, and in the almost pure cases of water-retention obesity thyroid can be of great value even though the basal metabolic rate is normal. In fatness associated with the menopause there is often evidence of thyroid deficiency, although this may not be the chief causative factor. An increasing lethargy, dulling and falling out of the hair, and failing memory, are suggestive signs, and when they are present thyroid should be used and will be of value even in spite of a normal basal metabolic rate.

Thyroid (*B.P.*) 1/2 grain before breakfast and dinner should form the initial dose. The patient's pulse rate and symptoms must be taken as a guide to increased dosage. Thus attacks of palpitation, or extrasystoles (especially at night), or a pulse rate persistently 20 beats per minute above the previous average, are to be taken as evidence of excessive dosage. In the absence of such signs the dose may be increased every three days by 1/2 grain twice daily. This increase should be continued either until signs of intoxication appear (in such, reduce the dose by a grain daily) or until the acceleration of weight loss induced by thyroid administration falls off to become almost imperceptible. This remark indicates an important point in the treatment of the obese—namely, the necessity of keeping a graph of weight loss (this the patient can do) and of charting the weight taken on the same scales in the same clothes, or preferably naked, at the same time every three days at least.

Obesity due to Endocrine Deficiency

Apart from myxoedema, which is characterized by subnormal temperature and pulse, dry and falling hair, loss of outer eyebrow, sluggish mentality, waxy facies with malar flush, and peculiar infiltration—especially about the eyes and supraclavicular regions—spontaneous endocrine deficiency can rarely be referred with certainty to a monoglandular disease. It is probably true to generalize to the extent of accusing the pituitary gland of producing nearly all grossly fat children, and of the fatness which may arise after childbirth. At the menopause the ovary, pituitary, and thyroid vary in their degree of complicity in individual cases. In every instance, apart from hypothyroidism, *the main line of treatment must be dietetic.*

Water Retention

Brief mention has already been made of a rare type of obesity largely due to water retention. This again is probably the result of some failure of the pituitary gland in its water-regulating mechanism, but it is important to recognize it because ordinary dietetic treatment will fail to reduce weight. The patients are usually young (12 to 30 years) and have a peculiar pallor not unlike that of parenchymatous nephritis. They are podgy and pasty, but do not pit. Their appetites are small, and on a diet of low calorie value—for example, 700 calories a day—loss of weight is trivial and not sustained. The urinary output is low—for example, 1 pint a day—yet the intake is normal. If these patients are put to bed the urine output invariably rises within a day to three, four, or five pints, and they lose weight. Such, then, are the characteristics of the water retainer. The accumulation of fluid is a big factor in excessive weight production, but not solely so.

Treatment consists of (1) limiting fluid intake to about 1½ pints a day ; (2) limiting salt intake by excluding salt from the dietary, including the processes of cooking ; (3) giving a diet of low calorie value as follows:

Six large bananas.
600 c.cm. of skimmed milk.
1/4 of medium-sized cabbage or lettuce.
Divide the above into three or four meals. Loss of weight will be about 1/2 lb. daily. After two to three weeks substitute for two bananas, two eggs and a little butter and green vegetables. Fish and lean meat a week later.

(4) Mercurial diuretics may be administered—for example, salyrgan 1 c.cm. intramuscularly twice a week for six weeks. This may be repeated four times a year if necessary.

Other Cases

In the other cases of endocrine deficiency if the first diet given in this paper is ineffective the patient should be put to bed, except for two hours up a day, and kept on the following for a month to six weeks:

Breakfast.—One egg and 1 oz. of bread.
Lunch.—One egg and 4 oz. of vegetables as below.
Dinner.—One cup of bouillon and 3 oz. of lean meat; 4 oz. of vegetables as below.
Vegetables Allowed.—Lettuce, cucumber, spinach, asparagus, endive, celery, mushrooms, tomatoes, sprouts, watercress, cauliflower, radish, cabbage.
Water, as much as needed. No fried foods. A teaspoonful of sodium bicarbonate daily.

It is essential that all the foods mentioned in this diet should be taken. Once a week the patient may have one meal of any food he wants. This is not so generous as it sounds, because after a few days of strict dieting the capacity for eating a large meal is lost. However, a "red-letter day" is something to look forward to, and encourages the victim in his perseverance. The reason for putting him to bed is that virtual starvation is more easily borne when at rest. Furthermore, he can be strictly controlled—a point of importance in children. In adults it is permissible to allow work to be continued on this diet, provided, of course, that there is no evidence of cardiac weakness.

Half to one pound a day is lost on this diet. It is apt to produce constipation and pimples if continued too long. As a rule a month is quite long enough, and during this time five drops of halibut-liver oil should be taken daily. An initial loss of weight of one to two stone having been achieved the following less drastic diet should be prescribed:

Breakfast.—One portion of fruit. One egg and white of one egg. Coffee, tea, bread substitute (for example, Heudebert's breadsticks).
Luncheon.—3 oz. lean meat, fish, or fowl. Half pint 5 per cent. vegetables.* One portion fruit.
Tea.—Tea.
Dinner.—3 oz. of meat, fish, or fowl, and vegetables as at lunch.
9.30 p.m.—Half a cup of orange juice. One oz. bemax.
In addition one and a half glasses skimmed milk daily (for calcium content). One capsule haliverol t.i.d. (for vitamin content).
A fruit portion = one orange; half grape-fruit; one medium apple; two medium peaches; one small pear; one cup strawberries; one cup blackberries.

When the desired weight is attained the diet should be slowly increased by adding butter, bread, and other vegetables. With a little care it is surprisingly easy to avoid return of obesity.

Dangers of Treatment

With the measures outlined above there are no dangers of vitamin deficiency, acidosis, or thyroid poisoning. There remains one fear, however, and that is for the heart. A rapid reduction of weight in the very fat patient of 50 or more may induce myocardial failure. For such persons only the first diet in this paper should be used, and even then a watch should be kept for a rising pulse rate, shortness of breath, and faintness, as signs of too rapid withdrawal of fat. As a useful precaution I regard the prescription of 10 minims of the *B.P.* tincture of digitalis thrice daily as helpful. Should signs of heart weakness appear, a tablespoonful of glucose should be given twice daily for three days, the diet raised to full normal, and the patient kept in bed for a week. Dieting may then be recommenced, but on a modified scale. Such eventualities are very rare, and indeed the plethoric, panting, corpulent caricature is far more likely to regain liveliness and slender lines from dieting than to suffer from a cardiac catastrophe.

* Lettuce, cabbage, cucumbers, spinach, asparagus, marrow, celery, tomatoes, brussels sprouts, cauliflower, radishes, mushrooms, rhubarb, scarlet runners, French beans, grape-fruit.

OBESITY: ITS CLASSIFICATION AND CAUSATION*

BY

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Obesity is a disease which has been known to man from time immemorial, but it has not been until the past twenty or thirty years that a proper realization of the importance of the disease has been reached. The meaning of the word itself, which first appeared in the English language in the early seventeenth century, is not without interest. It takes its origin from the word "obesus," which is the past participle of the Latin word "obedere." The meaning of "obesus" passed through several stages in Roman times and signified, in turn, "that which has eaten itself away," "that which has eaten itself fat," and finally it was occasionally used to indicate fatness, laziness, or slothfulness. It can be deduced that overeating, fatness, and laziness have been associated together from Roman times, and the fact that some English writers of two hundred years ago were aware of the disadvantages of overweight is shown by the following quotation from Pope's *Dunciad*: "He might truly be called a martyr to obesity." This dates back as far as 1728, but the word obesity was rarely used in any writings before the nineteenth century. During the present century, however, the public have taken the keenest interest in the subject and this has helped to stimulate the medical profession to give the disease the most careful consideration.

Definition of Obesity

It is not an easy matter to give a rigid definition of obesity. While gross forms of the disease are easily recognized, mild degrees are less readily appreciated. Indeed it is a matter of some difficulty to ascertain the ideal weight of any individual. We are all familiar with the average tables of weight, but there is some considerable difference between the figures given by the various authorities. A woman of 20 who is 65 inches in height should have a weight of 125 lb. according to Wood,[1] 127 lb. by the tables given by Lawrence,[2] and 129 lb. by the tables of the Metropolitan Life Insurance Company.

A somewhat different standard is adopted by some writers which is called the optimum or ideal weight. Lawrence and other authors compute this for diabetics by subtracting 10 per cent. from the average weight. While this rule may be excellent for the great bulk of diabetics who are past the third decade of life, exception should be made for young diabetics as they are especially liable to fall victims to tuberculosis. It is universally recognized[3] that individuals under 35 years are much better insurance risks if slightly above the average weight. A small reserve of fat seems to protect the individual against the infectious diseases such as tuberculosis, pneumonia, etc., which are the chief causes of death in the first decades of life. After taking various factors into consideration the Life Extension Institute[1] has issued tables by which the woman mentioned above should have an ideal weight of 134 lb. Even with the above large variations only the sex, age, and height have been taken into account. No allowance is made for any difference in the size of the bony skeleton from individual to individual, whereas it is a matter of everyday experience that two men of the same age and height may vary by a stone in weight and both be perfect specimens. To overcome these difficulties various calculations to give ideal weights have been suggested which are based on

* Part of an address given to the Birmingham Branch of the British Medical Association.

several measurements of the body, but the involved nature of the measurements and calculations has limited their use.

In practice the assessment of optimum weights, like so many other problems, should really be an individual matter and should rest on the clinical experience of the medical adviser. A complete physical examination should be undertaken in which particular attention should be paid to the amount of abdominal and other adipose tissue and also the size of the bony frame. This examination, together with a consideration of average tables, will serve as a basis of judgement for determining the ideal weight, but the advantage of slight overweight in youth, and the marked advantage of a weight less than the average after middle life when infectious diseases give way to degenerative diseases as the prime cause of death, should be carefully borne in mind.

Classification of Obesity

Many classifications of the various forms of obesity have been suggested and the following is that put forward by Zondek[4]:—

A. *Alimentary obesity* (overfeeding obesity), due to exogenous causes; fat distributed diffusely and uniformly over the whole body.

B. *Endocrine obesity*, due to endogenous causes; the adipose tissue shows regional predilection. The glands in question are: the thyroid gland, the pituitary body, the sex glands, the pineal body, the islet system of the pancreas, and the suprarenal cortex.

C. *Localized accumulation of fat* (lipomatosis).

It may be mentioned that the above classification, like all others, is not very satisfactory. The vast majority of cases fall within groups A and B, but it is often difficult to place any individual case strictly within one group or the other. Moreover, even within group B it is often impossible to say to what extent the different glands are responsible for the obesity. Perhaps these uncertainties are due to the fact that many factors are involved in the production of obesity, and these will be discussed later in this paper.

Importance of Obesity

Appearance.—Having arrived at the conclusion that the patient is overweight it remains to convince him and ourselves that a definite amount of this excess should be lost. Is it wise and is it worth while to reduce to the optimum figure? Perhaps the strongest appeal to the lay public is that of appearance. They know that the enviable figure becomes laughable and finally pitiable as weight is increased. The desirable figure of thirty years ago has given place to a much slimmer ideal. Perhaps this change of opinion is the outcome of the increased athletic tendencies, especially in the case of women, who have found that the figure of 1890 will not stand the speed and strain of 1936.

Diabetes.—Probably the most potent medical argument against obesity is the high incidence of diabetes among the obese. Joslin[5] goes so far as to say that diabetes is a penalty of obesity. He also gives the following figures for the mortality of diabetic men over 45 years of age:—

Per cent. overweight	Mortality
5 to 14	2 × normal
15 to 24	4 × normal
25 and over	10 × normal

Cardio-vascular Renal Disease.—Diseases of this category are the commonest cause of death after middle age. The heart and arteries labour under the strain of carrying nourishment to an enlarged vascular bed. High blood pressure, arteriosclerosis, apoplexy, and renal inefficiency are all concomitants of obesity, and one obvious and rational method of relieving unnecessary strain is to reduce the weight and size of the patient.

Arthritis.—Osteo-arthritis, in its many forms, is one of the commonest diseases encountered by the general practitioner and it is almost always associated with obesity. Exercises, manipulation, or any other forms of treatment are obviously of little value while one of the fundamental causes of the various conditions is ignored. A frame designed to carry 9 stone will continue to make protests in the form of painful hips, knees, arches of the feet, etc., as long as another 6 stone has to be supported. Reduction in weight is always a help to other forms of treatment and earns many grateful patients for the physician.

Nursing of Obese Patients.—Mechanical difficulties of nursing heavy patients and the increased risk of infection when large masses of adipose tissue are exposed after incision are often important factors militating against recovery of obese patients who come to operation for gall stones, diabetic gangrene, etc. Obesity is often a contributing factor in causing fractures and markedly alters the prognosis of elderly patients after these accidents.

Change of Mentality.—One of the more subtle distinctions, which is very obvious when dealing with many cases of obesity over a period of time, is the change of mentality which accompanies even a slight increase of weight. The proverbial tolerance and good nature of the slightly overweight soon degenerate into lack of ambition, apathy and torpor as this overweight becomes more marked. A possible physiological reason for the co-existence of torpor and obesity is the proximity of the centres for sleep and metabolism in the hypothalamus.

From a consideration of the above outline it can be stated, without fear of contradiction, that obesity is a dangerous malady because of its prevalence, its far-reaching effects and its insidious method of advance.

Cause of Obesity

All authorities agree that there is one fundamental cause for all forms of obesity, namely, that the energy intake is greater than the output. In other words, the sole avenue to obesity is through the mouth, and, although several factors modify the condition, there is no escape from the fundamental law that obesity can only be caused by the ingestion of food in excess of the individual's needs.

Different foods have different capacities for producing energy. Carbohydrates and proteins yield 4 calories per gram and fats 9 calories. In the course of a day a young man consumes, on an average, 500 grams of carbohydrate, 100 grams of protein, and 100 grams of fat, and this yields 3,300 calories. Of this total about half, 1,800 calories, is used to keep the vital processes going. Each day, from birth to death, the heart pounds on the chest wall 100,000 times and the bellows of the lungs open and close 20,000 times. Sleeping or waking, working or resting, eating or fasting, this activity must go on and there is no method of avoiding this expenditure of 1,800 calories.* If foods to this extent are withheld, then the patient must burn up the reserves of his body, and it is proved in practical experience that patients on diets less than the basal requirements always lose weight. This is often conveniently effected in practice by giving a diet of 1,000 calories, which, for most adults, is below the basal energy requirement. The 1,500 calories which remain of the daily ration after

* Pickworth[6] has suggested that certain individuals may lower their metabolism considerably below normally accepted values by training themselves in the assumption of mental and physical relaxation.

the vital expenditure is satisfied are used for work and play. If the patient, from inactivity or other reason, does not use this amount but continues to eat his full allowance of 3,300 calories, then he must inevitably gain in weight.

There is a common belief among the lay public that the body can absorb differentially—that is to say, that if an excess of food is taken in the diet, the amount required can be absorbed and the excess eliminated in the stools. This conception is, of course, quite wrong. The intestine does its work in a remarkably efficient manner, and no matter how much food is eaten, practically all of it is absorbed; the requirement is burnt and the excess stored as fat. Only on rare occasions does the gastro-intestinal tract complain and reject food by vomiting or diarrhoea, which are its sole methods of gaining relief.

Another great problem to patients is why some of them gain in weight while other persons remain slim on apparently the same diet. Of course this is a delusion in the great majority of cases. Very often it is not what the patient eats at meals but what is taken between meals that is the important factor. These extras may vary from large amounts of sugar in innumerable cups of tea and coffee, to cakes, pastry or chocolates which may be consumed in large quantities. Alcoholic drinks and many non-alcoholic ones, such as ginger-beer, are sources of calories which must be carefully inquired into. Few people realize the calorific value of alcoholic beverages.[7] A glass of beer yields 168 calories, which is not much less than the 184 calories of a similar glass of milk. An imperial quart of Allsopp's gives 674 calories. Another remarkable fact is that a bottle of whisky yields approximately 2,000 calories, which is equivalent to the yield from 1 lb. of sugar or ½ lb. of butter.

When all these aberrations of diet have been thoroughly explored it is found that many people really do require less than others if they are to remain slim. This is always a source of considerable interest to patients, and the explanation lies in the condition of the individual with regard to the three factors:—

1. Energy output, as governed by the activity, clothing, etc., of the patient.
2. Endocrine system.
3. Central nervous system.

Energy Output.—There is no doubt as to the difference of energy output of various individuals. One man is slow in all his movements and even his speech is measured and deliberate. He is apt to wrap himself in many garments with wool next to the skin and to adjust his gloves and muffler with care before venturing out to catch the nearest omnibus. He keeps in as warm an atmosphere as possible and is averse to opening windows. His slimmer neighbour walks briskly part of the way to his work, with gloves in his pocket and muffler at home. At week-ends he does not sit by the fire but enjoys exercise in the open air. All such activities are made possible by the energy of the food, but if the output of energy slackens and the diet is not decreased, then the food is stored in the body as fat.

Endocrine System.—A consideration of the above matters merges into a consideration of the endocrine system. Extreme examples of the neighbours may, of course, be cases of myxoedema and Graves's disease respectively. Formerly we were apt to dismiss the matter by saying that it was the nature of an individual to be slim and to want to take exercise or to be obese and less inclined to activity, but nowadays we realize that much of a man's nature depends on his endocrine endowment. This comes as a surprise to most patients, but an explanation of the effects wrought by abnormal functioning of the glands often serves to clarify the position. It is a matter of common knowledge that the removal of glands such as the thyroid gland, the testicles, or ovaries generally makes a vast change in the personality of an individual, but the removal of a leg, arm, or even such an organ as the spleen, makes no such change. Moreover, a small local lesion in the thyroid, pituitary, or suprarenal glands may be attended with the most disastrous psychological results while very large lesions in the bones, lungs, and other parts are without such effects.

The pituitary gland, which is called the "master gland" by Cushing,[8] and the "leader of the orchestra of glands" by Langdon-Brown,[9] plays an especially important part in the management of metabolism. It is probable that many mild cases of obesity such as those commonly found at puberty and the menopause, after pregnancy and certain diseases such as pneumonia, encephalitis, etc., are associated with dysfunction of this gland, because it is well known that it changes in structure and function in many of the above conditions.

Central Nervous System.—There is no space to deal further with the endocrines nor with their interaction with the nervous system, through which they produce many of their effects. It may be stated, however, that the area of the brain in close apposition to the pituitary has been proved to be especially important in this respect. Centres have been localized in the mid-brain which govern water, sugar, and lipoid metabolism and control temperature, blood pressure, hunger, thirst, and sleep. Our knowledge of this subject is based on animal experimentation and clinical experience, and, notwithstanding the inherent difficulty of the work, is rapidly being developed.[10]

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[7] Hutchison, R., and Mottram, V. H.: *Food and the Principles of Dietetics*, 1933, p. 402.
[8] Cushing, H.: *Lancet*, 1930, ii, 119, 175.
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The annual report to the Minister of Health by the chief alkali inspector for the year 1935 is now published (H.M. Stationery Office, 9d.). The Alkali Act, 1906, requires the best practicable means to be taken, by the owners, to eliminate or render harmless the escape of noxious or offensive gases from works engaged in a number of chemical processes—for example, alkali, cement, paraffin oil, tar, sulphuric acid, and arsenic works. The report calls special attention to atmospheric pollution by smoke. Many complaints have been received of excessive dust emission from cement works and, while it is not thought that this is directly injurious to health, the complaints are held to be justified on aesthetic grounds. The report records good progress in dust elimination, and expresses confidence that a substantial abatement will soon be effected. The production of sulphuric acid in England and Wales in 1935 amounted to 784,000 tons. The total acidity of gaseous escapes from these works averaged 1.61 grains of sulphuric anhydride per cubic foot, which is a little higher than last year but still compares favourably with the 4 grains permitted under the provisions of the Act. A serious warning is sounded in connexion with emissions of hydrogen sulphide—a deadly poison.

ONE HUNDRED AND FOURTH ANNUAL MEETING
of the
British Medical Association
HELD IN OXFORD, JULY, 1936

THE SECTIONS

SUMMARY OF PROCEEDINGS

During the next few months there will be published in the BRITISH MEDICAL JOURNAL *the Opening Papers communicated to the Scientific Sections of the Annual Meeting at Oxford. The reports of discussions, concluded in this issue (p. 360), are intended to give members who were not present a general idea of the proceedings.*

SECTIONS OF MEDICINE AND SURGERY

Friday, July 24th

Surgery of Pulmonary Tuberculosis

With Dr. G. A. GIBSON (Oxford), President of the Section of Medicine, in the chair, Dr. JOHS. GRAVESEN (Denmark) opened a discussion on the surgery of pulmonary tuberculosis with a paper which was published in full on August 8th (p. 269).

Dr. F. G. CHANDLER said that, with Mr. Tudor Edwards, he had had the privilege of opening a similar discussion at the Association meeting eight years ago. He thought that the chief advances made since that time had been in the further development of bilateral surgical procedures, in partial thoracoplasties, and in internal pneumolysis or division of adhesions. In all these developments Dr. Gravesen had played no small part. Dr. Chandler was in agreement with the indications for operation which Dr. Gravesen had presented, except that he would not be so conservative in progressive unilateral cases. He gave some illustrations of his experience in the division of adhesions which were preventing a successful pneumothorax. Thoracoscopy and pneumolysis was a procedure with little risk and few complications, given a careful selection of cases. He considered oleothorax very useful, especially in cases in which obliterative pleurisy was occurring. He agreed with Dr. Gravesen's attitude to phrenic evulsion. Regarding thoracoplasty, Dr. Chandler thought the decision for its performance must always be a difficult one. In old-standing chronic unilateral disease where the other lung had proved itself more or less invulnerable there was an ideal indication. But in more recent disease, and if the disease were bilateral, the problem might sometimes be solved only by considering what the surgeon would have done to himself were he the patient. Thoracoplasty was not in itself a curative operation. It was one designed to help the natural healing processes.

Mr. WILLIAM ANDERSON (Aberdeen) said that, while he agreed with Dr. Gravesen in his theory of relaxation, he felt that other factors must also be of importance. He thought that rest, or at least diminished movement, must count a great deal in the benefits obtained from artificial pneumothorax or surgical procedures. The question of rest or splintage was important in considering the desirability or otherwise of regeneration of ribs after resection. If relaxation were the sole factor in helping the curative process then attempts ought to be made to prevent bone regeneration. If, however, a permanent diminution of chest movement was to be aimed at, regeneration of bone at a later stage would be an advantage. With regard to phrenic evulsion, Mr. Anderson had observed such variable results that he doubted if its occasional benefits could be explained purely on mechanical grounds. There was no justification for performing phrenic evulsion as a "feeler" to test the patient's power to stand thoracoplasty. As to thoracoplasty, he considered that the most important point in the determination of the optimum time for operation was the opinion of the attending physician. The latter had had the opportunity over months or years of watching the patient's reaction to different forms of treatment, his reaction to bouts of auto-inoculation, and, perhaps as important as any, his mental attitude to the disease. He was as yet not convinced of the value of partial thoracoplasty. The two points in the technique of total thoracoplasty which he wished to stress were the division of the operation into stages and the use of blood transfusion in weak or toxic cases.

Dr. GEOFFREY MARSHALL agreed with Mr. Anderson in the importance of immobilization as well as relaxation. The essential indication for relaxation therapy was cavitation. Cavities of more than 2 or 3 cm. diameter seldom healed without relaxation therapy. A few patients with persistent tuberculous cavities lived for long periods, but the great majority failed to survive five years. Unless there was extensive bilateral disease or some other vital contraindication the first aim should be to induce an effective pneumothorax. He emphasized the importance of division of long, narrow adhesions when the patient had improved and the cavity had become invisible to *x* rays. These were the cases which gave rise to the most bitter disappointments of pneumothorax treatment. After two or three years' seemingly successful treatment one was likely to be faced with the appearance of new areas of disease in the opposite lung. One found, too, that the cavity over which the apparently harmless adhesion was attached had never really healed. He could recall no case of cavitation of the lower lobes in which healing had occurred as a result of phrenicectomy, but had seen two cases in which apical cavities closed. He had had much disappointment in cases treated by apicolysis with wax plombage. He agreed with Dr. Gravesen's indications for thoracoplasty, but was in the same doubt as Mr. Anderson as to the value of partial thoracoplasties.

Mr. C. PRICE THOMAS thought it would be more profitable to the patients and to those in charge of their treatment if the attitude were taken that pulmonary tuberculosis was a localized disease with generalized manifestations, rather than the more commonly expressed converse. There were still too many clinicians who depended on rest and the so-called building up of the patient's resistance. Laudable as that was, it was illogical as the sole procedure, since further rest could be given by relaxation therapy. The benefits of rest he thought could be attributed to decrease of lymphatic drainage, and possibly to increasing fibrosis from venous congestion. He agreed with Dr. Gravesen that division of adhesions should be more often performed, and insisted that no adhesion should be deemed indivisible by cautery until a thoracoscopic examination had been made. He thought that contralateral artificial pneumothorax sometimes made a cavity larger. In some cases this might be due to the production of a valve-like obstruction in the bronchus draining the cavity. Regarding apicolysis, he considered the extra-fascial superior to the extra-pleural method.

Mr. HUGH REID (Liverpool) claimed that phrenic evulsion, in carefully selected cases, was of great usefulness. Mr. J. B. HUNTER decried the tendency to think too much of the cavity while forgetting what was happening around it. He considered that too much abuse had been directed at phrenicectomy. Wax plombage also had its advantages, and was best used in a chest wall which had been partially stilled by a thoracoplasty. Mr. F. RONALD EDWARDS (Liverpool) said that pulmonary tuberculosis was a much more extensive disease microscopically than was revealed by *x* rays, and on that account was against localized thoracoplasties.

Dr. GRAVESEN, in reply, said that he would like to think kindly of the benefits of rest, but there was still

a great deal of activity in the collapsed lung. He reiterated that in his large series of cases the results of selective operations were better than those of total thoracoplasties, and that, in his opinion, phrenic evulsion was a useless procedure.

SECTIONS OF PATHOLOGY AND PHYSIOLOGY

Friday, July 24th

Substances Promoting Growth

With Professor R. A. PETERS in the chair at this combined meeting, a discussion on substances promoting normal and abnormal growth was opened by Dr. JOSEPH NEEDHAM (Cambridge).

In this symposium Dr. Needham said the speakers would be concerned entirely with the " coming-to-be " of living organisms. This growth was usually accompanied by differentiation leading to ever higher levels of internal organization. It was easier to picture how one cell could produce another exactly like itself than how regional changes occurred. What exactly was going on when a minute depression which would later become the liver appeared in the floor of the archenteron? We would not separate differentiation from growth in our thought nor ought we to consider substances affecting the one without considering substances affecting the other.

Growth could be stimulated by (1) optimum nutrition, and (2) some specific stimulus. Obviously all growth and differentiation depended upon normal nutritive relationships, but studies of tissue cultures had shown that cell multiplication and growth was greatly increased if a small amount of embryo extract was present. Of the glandular hormones stimulating growth a well-known example was thyroxine. In amphibia this substance initiated the process of growth of the fore and hind limbs and that of resorption of the tail and gills. The relation of the sex hormones to the growth of the uterine endometrium, and of the pituitary to the growth of long bones, must also be mentioned. As a result of the experiments and researches of Spemann and others it was now known that two types of behaviour were possible in a fragment of an embryo grafted into an unusual situation. It might " fall into step " with its new environment and produce cells and structures congruent with it, or it might be true to its special mission and proceed unaffected by its environment. The first behaviour corresponded to dependent differentiation and the second to self-differentiation. The first fragment was not yet " determined " to fill its usual destiny ; the second was. The formation of the main neural axis of the amphibian embryo was brought about by the development of two longitudinal ridges which arose on the dorsal surface as gastrulation ended. These first formed a furrow or groove and then fused at the edges, and thus formed the neural tube. Before their formation the dorsal ectoderm was undetermined, but while they were forming it became determined for this neural fate. The extent of the determination was exactly parallel to the extent to which the dorsal ectoderm had been underlain by the invaginating mesoderm which had been entering the egg at the dorsal lip of the blastopore. If a piece of this dorsal lip were to be transplanted into another embryo on its ventral side it would induce the abdominal ectoderm to form a neural axis in addition to the normal one which the host was itself engaged in making. Further investigation of this primary organizer had shown that it was present everywhere in the embryo, but that it was only liberated in active form in the dorsal lip. Organizer phenomena occurred in all vertebrate development and in a modified form in many invertebrates. Among the vertebrates there was no species specificity, for a supernumerary rabbit embryo had been induced by a piece of chick primitive streak ; chick and duck organizers were quite interchangeable.

Turning to vitamins, Dr. Needham said that he would mention two or three striking instances in which vitamin lack produced far-reaching changes. In pigs the absence of vitamin A might result in the hind limb being represented by a little stringy appendage. If a chick embryo developed in an egg produced by a hen suffering from a lack of vitamin E, about the end of the fourth day of incubation an intensive cell proliferation in the mesoderm resulted in the choking of the vitelline blood vessels and the embryo perished of anoxaemia.

The next group of substances dealt with were the drug-like stimulants—mostly tar derivatives. Carcinogenic substances could be produced from sterols by a deranged metabolism. It had been shown that the oxidation products of the active hydrocarbons all inhibited both respiration and glycolysis, and this might form a link with Warburg's investigations. There seemed to be a definite relation between the hydrocarbons, carcinogenic, oestrogenic, primary organizer, and sterol substances.

Specific Growth Stimulants

Professor J. W. COOK said that the most active carcinogenic compounds so far known were found among the cholanthrene group. Methylcholanthrene was a hydrocarbon which could be prepared in the laboratory by simple chemical transformations from cholic acid or deoxycholic acid. The chemical changes involved in these transformations were of exactly the same type as many well-known examples of biochemical change, although the actual occurrence in the body of these particular changes had not been demonstrated. He showed that similar normal body processes were able to change other non-growth-promoting into growth-promoting substances.

Dr. P. R. PEACOCK (Glasgow) said that there were three classes of growth-stimulating agents: (1) chemical agents such as those mentioned by Professor Cook, all local in action but not specific ; (2) viruses or filterable agents, local in action but specific in the histology of the tumour, and not species specific ; (3) hormones having a tissue specificity and an action which might be exercised at a distance.

Oestrogenic Bombshell

Professor E. C. DODDS said that during recent weeks a number of interesting, and in fact, amazing publications had appeared, which destroyed what little orderliness there appeared to be on this subject. He confined his remarks to compounds with oestrogenic activity. Until recently all active compounds had one point in common—namely, the phenanthrene ring system—and this observation had led many to the supposition that the phenanthrene nucleus was essential for oestrogenic activity. Together with Lawson he had recently synthesized a series of compounds which although highly active did not contain the phenanthrene ring system ; similar observations had been made by Branch, Clapp, and Morton with regard to carcinogenic hydrocarbons. Until their publication the known carcinogenic hydrocarbons all contained the phenanthrene ring system, but they had been able to show that symmetrical triphenylbenzene and tetraphenylmethane were definitely active. More recently still the work of Andrews and Fenger came as an even greater surprise ; in fact it could be justifiably referred to as a bombshell. These observers claimed to have isolated a crystalline substance from the unsaponifiable material of the ovary which was an entirely new sex hormone with the formula $C_{20}.H_{41}.O_2.N$. This compound was over a hundred times more potent than oestrone and, as could be seen from its empirical formula, could not belong to any of the known groups of oestrogenic agents. If this observation was confirmed an entirely new era would begin in connexion with the problem of oestrogenesis.

Mr. C. H. WADDINGTON (Cambridge) spoke of the hypothesis that substances may act by liberating an evocator from an inactive substance present in the tissues. He also drew attention to the individuating agents which were active in embryonic development, and suggested that similar agents must be present in adult life. Tumour formation involved an escape from these agents, and no full account of tumour formation could be given if individuating systems were neglected. Mr. HAROLD BURROWS held that in considering the action of sex hormones the sexual qualities of the individual tissue must be regarded rather than the sex of the host. The cellular responses to the sex hormones depended as much upon the intrinsic, and perhaps innate, qualities of the individual cells as they

did upon the particular characters of the sex hormone. The benign cellular proliferations induced by sex hormones did not persist unless the supply of hormone was maintained.

Dr. HADDON presented evidence that the first action of these carcinogenic substances was inhibitory to growth. Experiments were carried out in young rats, and the batch in which dibenzanthracene was injected into the peritoneum showed a pronounced inhibition of growth ; an even more striking inhibition was of the growth of Walker tumour grafts. Non-carcinogenic hydrocarbons had no such effect. The carcinogenic properties and the inhibitory characters appeared to go hand in hand. The constant inhibition might eventually release a cell or tissue from the normal body control. Dr. S. ZUCKERMANN considered that sex hormones could have an effect on the pituitary, and this gland could produce a hormone which had unusual effects on the gonads. He also considered that the idea of antagonism between sex hormones should be dropped.

SECTION OF OBSTETRICS AND GYNAECOLOGY

Friday, July 24th

Anaemia in Pregnancy

The discussion was opened by Dr. CAREY SMALLWOOD (Birmingham), Professor AMY FLEMING being in the chair.

After a brief classification of the types of anaemia that may coexist with pregnancy, the opener drew a distinction between the physiological anaemia of pregnancy, which was due to hydraemia and in which the haemoglobin percentage was seldom below 80, and hypochromic, or microcytic, anaemia. In microcytic anaemia the red cell count was about normal, but the colour index was low, and very low readings of haemoglobin might be present. Pregnant women were especially liable to this type of anaemia, partly because of the increased iron demanded by the foetus and the growing uterus, and partly on account of the changes in the maternal gastro-intestinal system. With regard to the latter, he had found that iron deficiency ran parallel with hypochlorhydria, which was a common accompaniment of pregnancy, especially in those suffering from nutritional defects. His experience was that these microcytic anaemias could be both prevented and cured by the administration of iron, the condition being one of iron deficiency.

Miss JOCELYN MOORE read a paper, in the production of which Dr. E. C. PILLMAN-WILLIAMS had collaborated. She remarked on the not uncommon association of anaemia with such conditions as pyelitis, chronic nephritis, and toxaemia of pregnancy. A series of pregnant patients had been given extra iron in the form of Blaud's pills throughout the ante-natal period, while a control group was also studied. Both groups were able to take an adequately balanced general diet. A lesser incidence of toxaemia had been found in the iron-treated group. In cases of established toxaemia the haemoglobin was found to be deficient. When estimating gastric acidity it was found that there was a seasonal incidence in the response to histamine injections, the secretion appearing to be greater in the summer months. The blood urea did not vary to any noticeable extent in patients who were, or were not, treated with extra iron.

Dr. G. W. THEOBALD entirely disagreed with the suggestion that anaemia was of prime importance in the aetiology of toxaemias. In Bangkok the average haemoglobin percentage was below 50, and yet toxaemia was very uncommon. He believed the toxaemias to be deficiency diseases, but iron was by no means the only substance lacking ; there was an immense field for research by obstetricians into correct dietetic principles. With regard to microcytic anaemias, he believed that every pregnant woman should be given iron in pill form, and this should be combined with the administration of iodine, calcium, and concentrated vitamins. He thought that it was more practical to administer these necessary substances in concentrated form than to recommend poor patients to adhere to a special diet which they could not afford. He disagreed with the opener, and believed that a physiological anaemia did not exist.

Dame LOUISE MCILROY agreed with Dr. Theobald that iron deficiency alone could not be held to account for toxaemia. There was need for much more research on the subject, but meanwhile she had found treatment with iron to be of benefit. She had also had good results with iron therapy in the treatment of excessive vomiting. Professor JAMES YOUNG thought that there was a growing tendency in ante-natal clinics to put patients on restricted diets with the idea of avoiding toxaemias. He felt that this was likely to bring about a great deal of trouble through iron deficiency. Dr. MACRAE (Gold Coast) said that in her district the common anaemia associated with pregnancy was of the macrocytic type. It progressed rapidly and was often fatal, but responded dramatically to liver therapy.

Dr. MABEL RAMSAY (Plymouth) said that she had found eagerness among the public to be instructed in proper dietetic principles. She believed that steps should be taken to provide suitable diets for pregnant women. Dr. PILLMAN-WILLIAMS thought the proper term for microcytic anaemia should be nutritional anaemia, and that iron deficiency was the chief factor in its causation. Dr. CAREY SMALLWOOD, replying, said that he reaffirmed the existence of a physiological anaemia in pregnancy. It was present in cases where no lack of iron could be demonstrated, and was simply due to hydraemia.

SECTION OF OPHTHALMOLOGY

Friday, July 24th

Glaucoma and Sepsis

With Mr. J. W. TUDOR THOMAS (Cardiff), and subsequently the President, Mr. P. E. H. ADAMS (Oxford), in the chair, Dr. R. A. KERRY (Montreal) read a paper on glaucoma and sepsis. He distinguished between posterior and anterior glaucoma, the posterior variety being due to uveitis, and characterized by diffuse infiltration of the optic nerve with loss of tissue, whilst anterior glaucoma due to cyclitis was evidenced by hypertension and a shallow anterior chamber, due to the iris being pushed forward by the swollen ciliary body. He recalled a previous publication of his showing the presence of attenuated staphylococci in glaucomatous eyes, and held that the primary source of glaucoma is to be sought in the infected nose and sinuses.

Detachment of the Retina

Mr. J. COLE MARSHALL, in a paper on the present position of operative treatment in detachment of the retina, discussed the more recent methods of localizing holes, stressing the catholysis method of Vogt ; a diathermy needle could be used instead. Controlled degrees of heat for surface coagulation was another advance, and could be obtained by the Coppez pyometric method or by Pesine's apparatus. He mentioned the use of electrolysis for sealing down the retina, and pointed out that diathermy was needed where the edges of the tear stood strongly away. He also demonstrated a film showing the technique of the Jameson recession operation for squint. His paper produced a lively discussion, in which Dr. L. MITCHELL (Melbourne), Mr. A. PALIN (Edinburgh), Mr. T. HARRISON BUTLER (Birmingham), Mr. J. GRAY CLEGG (Manchester) and Mr. H. CAIGER (Sheffield) took part.

Divergent Squint and Amblyopia

Miss E. E. CASS, in a paper on divergent squint, said there were two types of this form of squint, one arising from divergence excess and the other from convergence insufficiency, the latter being the more common form in her eighty-five cases. In the divergence excess type the squint was greater in distant vision, while in the convergence insufficiency type it was greater on near and slight in distant vision. Divergent squint was commoner in girls than in boys, and arose at any age in childhood. Myopia was rare and hyperphoria common ; torticollis

also occurred. When the squint was small binocular vision was present. In treatment, suppression should be broken down and diplopia encouraged. Glasses were not of much value, except in myopes, and the scope for surgery was limited. She advocated full orthoptic treatment.

Dr. W. H. Summerskill, in a paper on restoration of the visual and fusion functions of amblyopic eyes, advocated the study of the psychological make-up of the patient with amblyopia. He quoted cases of amblyopia successfully treated by hypnotic suggestion together with orthoptic exercises. Sir James Barrett (Melbourne) stated that congenital amblyopia was extremely rare, and that no histological study of such an eye had been made.

Night-blindness

Professor W. Burridge (Lucknow), in a paper on some fundamentals of vision, with remarks on night-blindness, drew attention to the assumption that electrical stimulation of muscle, nerve, or retina disturbed an inherent quiescence of the tissue involved. As stimulation by drugs gave a different response the possibility that both might be artefacts arose. He held that the retinal end-organs had an inherent rhythmical activity augmented by light. On the basis of this assumption it was possible to deduce or predict the known facts of colour vision and its anomalies, as also the existence of after-images, scotopic and photopic vision, night-blindness, and other fundamental qualities of vision. He showed that the predictable mechanism of night-blindness could be put in operation by many causes.

Mr. J. Gray Clegg (Manchester), in a paper on the optic foramen, drew attention to the newer knowledge of its anatomy as revealed by *x* rays. There were various physiological variations which affected the clinical course of a lesion of the optic nerve ; a narrow foramen was an obvious factor when inflammatory exudates appeared. He cited a number of cases illustrated by lantern slides.

Aetiology of Myopia

Mr. Arnold Sorsby, in a paper on some problems in the aetiology of myopia, reviewed the factors entering into the total refraction of the eye. He stressed the great variability in the refractive power of the cornea and lens, and questioned the dogma of axial elongation as the most frequent cause of myopia. He held that myopic fundus changes did not necessarily imply stretching. The generally advanced explanations of myopia left a number of problems unsolved, and ignored the vast changes that take place in the anterior segment of the eye during growth. Sir James Barrett drew attention to the state of refraction in animals.

SECTION OF ORTHOPAEDICS

Friday, July 24th

Fractures in the Region of the Elbow-joint

With the President of the Section, Mr. G. R. Girdlestone (Oxford), in the chair, Mr. Naughton Dunn (Birmingham) opened a discussion on fractures in the region of the elbow-joint. Mr. Dunn said that supracondylar fracture was the commonest injury in the region of the elbow, and was found most frequently in the 8 to 12 age group. In the majority of cases manipulative reduction, as taught early in the century by Robert Jones, was the ideal treatment. Perfect anatomical reposition must be obtained, otherwise alteration in the carrying angle or limitation of extension would result. The only after-treatment permitted, and this after not less than three weeks' fixation, was active movement of gradually increasing range. Light massage did no harm, but passive movements were the most potent cause of myositis ossificans.

Fracture of the Olecranon Process

Mr. George Perkins, speaking of fractures of the olecranon process, said he treated these fractures without separation as simple sprains, seeing that late separation never occurred. The serious cases were those in which a definite gap was present. Persistence of the gap led to weakness of the triceps and to limitation of extension of the elbow, the beak of the olecranon being too high to fit into the fossa in the humerus in full extension. But in people past middle life these disabilities were often inconsiderable, a point worth bearing in mind, since the results of operative treatment were far from satisfactory. The gap would persist if open operation was not performed ; there was no closed method of approximating the fragments. The ideal time for operation was within the first twenty-four hours ; intervention should otherwise be postponed for seven to ten days, by which time absorption of effused blood would be beginning. The insertion of the suture material was a procedure less simple than it appeared. Breakages were frequent, and the suture might cut out of the lower fragment where the bone lamellae were parallel with the line of tension. This last could be avoided by tying the suture posteriorly after it had been passed through the transverse drill hole in the lower fragment, and then passing it transversely through the insertion of the triceps. The ideal suture material had yet to be discovered, but it was probable that so far fascia lata was the best. Active movements were allowed after fourteen days of complete fixation at a right angle.

Fractures of the Radial Head

Mr. N. St. J. G. D. Buxton said that the vertical fissure in the head of the radius called for conservative treatment ; in the fracture where one loose fragment was present the latter should be removed as soon as possible by open operation. Comminuted fractures were best left for six weeks, and then dealt with by excision of the head and part of the neck. The majority of fractures of the neck of the radius were not accompanied by much displacement of the proximal fragment, but when displacement was present operative reposition was almost invariably needed, and very desirable in all patients under 40. If internal fixation was also required, marginal catgut sutures might suffice, but a counter-sunk bone peg inserted through the concavity of the head of the radius gave consistently good results. Fractures of the capitellar surface of the humerus were to be dealt with conservatively if there was no displacement, but displacement almost always demanded open reposition and sometimes internal fixation with catgut or a fine bone peg.

Internal Epicondyle of the Humerus

Mr. S. L. Higgs described the various types of fracture of the medial epicondyle of the humerus. The simple chip without displacement called for little comment. More difficult were the cases with displacement, particularly when the fragment had been trapped in the joint. Cases showing simple downward displacement were generally treated conservatively, but this was never followed by bony union, and, although the immediate result appeared satisfactory, the patient might complain years later of painful mobility of the fragment, lateral instability of the elbow, or even ulnar nerve symptoms due to chronic irritation of the nerve by the irregular bony fragment. Open operation was clearly indicated. Displacement of the medial epicondyle into the joint resulted from a violent abduction injury, and the ulnar nerve was often damaged at the same time. Open operation should be performed, not only to secure replacement of the bony fragment, but to transpose the ulnar nerve anteriorily, well away from the area of fracture.

Mr. Norman W. Roberts (Liverpool) thought that if the minor fractures and separations were excluded the remaining cases presented essentially the same problem. Momentary outward subluxation of the elbow probably occurred at the time of injury in all complete avulsion fractures, and if any intra-articular inclusion could be remedied by a closed manipulation the gravity of the lesion was considerably reduced. The ulnar nerve lesion was often incomplete and occasionally entirely absent. No transposition of the ulnar nerve was necessary, and cases were quoted in which there had been recovery of a complete nerve lesion when the injury was severe. Bony union of

the epicondyle was by no means certain after operative reposition, and excellent functional results were to be expected with conservative treatment. If the primary injury to the ulnar nerve failed to recover, or if a secondary neuritis developed, transposition of the nerve could be undertaken at a later date.

Discussion

Mr. Max Page was sorry that attention had been paid to detail rather than to general principles. If one practised (1) anatomical reduction of every fracture in the region of a joint, (2) immobilization until bony union was sound, and (3) fixation in a position that avoided the troublesome sequelae known to follow a particular fracture, few mistakes would be made. He favoured the position of full extension after open operation on the olecranon and in certain fractures of the head of the radius. Much of his fracture practice was among policemen, to whom full movement of the elbow meant a great deal.

Mr. Whitchurch Howell described a method of obtaining full supination of the forearm during fixation of a supracondylar fracture. Mr. Watson Jones said that there were few masseuses who could be trusted to avoid passive movements when treating a fracture in the region of the elbow-joint, and he thought it the duty of the surgeon not only to keep the patient out of the hands of the masseuse but to warn him against well-meant efforts of his own to increase the range of movement by such passive stretching as resulted from carrying weights or bags.

The openers replied, and in answer to Mr. Roberts, Mr. Higgs said that he had seen a case of late ulnar neuritis which appeared about twenty-eight years after an untreated epicondylar fracture of the humerus.

Treatment of Hallux Valgus and Rigidus

Mr. T. P. McMurray (Liverpool) read a paper on the treatment of hallux valgus and rigidus, which was published in full in the *Journal* of August 1st (p. 218).

A brief discussion followed, in which Mr. Naughton Dunn, Miss Forrester-Brown (Bath), and Mr. A. Rocyn Jones took part.

SECTION OF HISTORY OF MEDICINE

Friday, July 24th

The Early Scholar Physicians of Oxford

With Dr. Arnold Chaplin, the President, in the chair, the first paper was by Dr. A. P. Cawadias on "Thomas Linacre and the Early Scholar Physicians of Oxford."

Dr. Cawadias described Linacre and Leonicenus as the greatest physicians of the Early Renaissance. Linacre and his satellites represented that period in Oxford in which Greek learning was introduced and modern or Western European medicine originated. Linacre was a great Greek scholar as well as a great physician—a combination exhibited by his Oxford contemporaries, Edward Wotton, John Clement, Richard Bartlot, Thomas Bentley, and John Chambers, as well as by his Cambridge counterpart, John Caius. The author briefly traced the career of Linacre and of each of these humanist physicians. These men were good physicians, though they were scholars first. Study of the Greeks had trained them in careful observation and clear reasoning, and had developed in them at the same time those human qualities which made for success in medicine. The part they played in its science and practice consisted in the introduction of new methods and a revival of the Hippocratic approach to disease.

Professor Charles Singer pointed out that the Middle Ages learned foreign languages by the spoken method, and political circumstances made teachers of Arabic more accessible than teachers of Greek. The second half of the fifteenth century, however, reversed these conditions: Greek teachers then became more accessible, and the study of grammar in the modern sense began to take the place of the old direct method of learning by speech. Thus the structure of language became material for the application of the experimental method, and the scholar physicians of the type of Linacre were the true fathers of science. Dr. R. T. Gunther (Oxford) said it was important that the evidence for the revival of science in Oxford in the thirteenth century should be further studied, but the revival reached its full expression later—that is, 1325–50—as evidenced by the work of the early scientific members of Merton, and continued until the time of Chaucer at the end of the fourteenth century, when it gradually relapsed.

Oxford Medicine in the Seventeenth Century

Dr. R. T. Gunther, in a paper, gave illustrations derived from the history and use of drugs of the persistence of ancient tradition in spite of the teachings of more recent scientific discoveries. The coexistence of the old and the new methods of treatment made it impossible to assign any precise date to delimit the old paleosophy from the neosophy for which the seventeenth century was famed. The elaboration of conglomerated prescriptions gave place towards the close of the seventeenth century to simple medicines, as advocated by Sir John Floyer of Queen's, who wrote a treatise on "The Tastes and Odours of Drugs," and declared that "Ingenuous Praticers will reject the artificial Jumbles of many medicines together and chiefly make use of Simple Medicines, by which [their] patients will be more suddenly, safely, and pleasantly cured." He drew attention to certain significant dates in the century, beginning with 1613, the foundation of Wadham, a centre to which many great scientists belonged. He suggested that in 1642, on the battlefield of Edge Hill, William Harvey had the opportunity of sowing the golden seeds of respect for learning in the impressionable mind of young Prince Charles, seeds which fructified twenty years later when, as king, Charles signed the charter of the Royal Society. The operations of which the practice was advanced during this century were: injection of various fluids, including wine and ale, into the veins of dogs through quills fastened to bladders, by Christopher Wren and Robert Hooke; a successful operation for removal of the spleen, again by Wren, in 1663; the employment of milk as an injection medium by Lower in 1664, for the study of the liver; the injection methods of Willis; transfusion, dating from 1666; the opening of a suppurating hydatid cyst of the liver by John Locke in 1668; and the treatment of tic douloureux, also by Locke. Dr. Gunther exhibited as an example of seventeenth century practice what he believed to be a lapis nephriticus; it was a piece of greenish-black serpentine, from the Addenbrooke collection at St. Catharine's College, Cambridge. Mr. McAdam Eccles suggested that this was either a charm worn on the body or an early attempt to control hernia.

Medical Teachers in the Eighteenth and Nineteenth Centuries

Sir Humphry Rolleston, in a review of the events and personalities of Oxford medicine, said that in the eighteenth century, while the conditions were extremely unsatisfactory, the redeeming feature was the number of endowments which medicine received or shared with the University. These were the benefactions of John Radcliffe, amounting eventually to £140,000, of Matthew Lee, of the Earl of Lichfield, and of George Oakley Aldrich. The occupants of the Lee readership and of the Lichfield and the Aldrichian chairs were naturally the teachers of medicine during the second part of the eighteenth and the first part of the nineteenth centuries. More than one of the chairs were held by the same man, especially by the Regius professors Kidd, Ogle, and Acland. The Regius professorship was founded in 1546. During the eighteenth century it had six occupants—Thomas Hoy, Joshua Lasher, William Beauvoir, William Woodford, John Kelly, and William Vivian. Strange as it might now seem, the Regius professor was not always the most eminent of the medical men resident in Oxford, at any rate as judged by contributions to medical knowledge. In 1801 Christopher Pegge became Regius professor. Cox, the esquire bedel

and coroner, who not only knew Pegge, but attended some of his lectures, spoke of his noble appearance and courteous manner, but diluted this praise by the rather telling comment that John Kidd, his successor as Regius " a man in all things straightforward and anti-humbug, was the first medical doctor who rejected the wig and large-brimmed hat and never, I believe, carried a gold-headed stick." Sir Humphry Rolleston then spoke briefly of the work of Kidd, Ogle, and Henry Acland, which carried on the story of the Regius professorship until nearly the end of the nineteenth century. The debt that Oxford owed to Acland, he said, had been somewhat forgotten, if indeed it was ever properly recognized.

The Oxford Medical School

Dr. K. J. FRANKLIN (Oxford) completed the history with an account of the Oxford medical school, which, he said, really dated from 1883, when Burdon-Sanderson came to Oxford as first Waynflete professor of physiology. He gave a brief sketch of the earlier decline of medical teaching at Oxford, until at the beginning of last century the number of those graduating averaged only one a year, and then he traced the successive steps of recovery. The first step was the creation of an Honour School of Natural (then called Physical) Science in 1850, followed by the building of a museum, opened in 1860. At about this time the rearrangement of medical and anatomical chairs was begun, one of its results being the creation of a new Linacre professorship of anatomy and physiology. The Linacre chair was presently turned into one of human and comparative anatomy, and physiology assigned to a new chair, to which Burdon-Sanderson was appointed. His appointment was followed by that of Arthur Thomson as lecturer in human anatomy. In 1895 Burdon-Sanderson succeeded Acland in the Regius professorship. In 1901 the new pathological laboratory was opened, and in the following year a readership in ophthalmology was founded. Osler became Regius professor in 1904, and in 1907 Georges Dreyer came from Denmark to be the first professor of pathology. In 1912 more adequate provision was made for pharmacology, and J. A. Gunn appointed reader. In the following year Sherrington succeeded Gotch as Waynflete professor of physiology. Osler died in 1919, and was succeeded in the Regius professorship by Sir Archibald Garrod, and he, in 1928, by Sir Farquhar Buzzard. The author touched briefly on other events—the appointment of Dr. Ainley Walker as dean, the creation of a new department of biochemistry, the building of a new school of pathology, and, most recently, the anonymous gift towards the foundation of a new Institute of Experimental Psychology. Dr. Franklin filled in this bare recital of events with personal impressions of the more recent teachers and benefactors of a medical school which, in the words of the President of the British Medical Association, " we want to keep one step ahead of any other." He also showed a cinematograph film of some Oxford medical personalities.

SECTION OF TUBERCULOSIS

Friday, July 24th

Laboratory Investigations in Phthisis

Dr. W. STOBIE, President of the Section, took the chair when Dr. L. E. HOUGHTON (Hendon) opened a discussion on the value and limitations of laboratory investigations in the prognosis and treatment of pulmonary tuberculosis. He confined his remarks to blood examinations, basing these on his experience of nearly 2,000 cases at Colindale Hospital. The total leucocyte count did not increase the information derived from the differential count. The sedimentation rate, taken by itself, was of little prognostic value, but it indicated the constitutional disturbance resulting from the disease. In the differential count three cells were of importance: the monocyte represented tubercle formation, the neutrophil tubercle undergoing abscess formation, and the lymphocyte the healing phase of the tuberculous lesion. A relative lymphocytosis showed good potential resistance to the disease ; the Bonsdorff count (enumeration of the lobes of the nuclei of 100 polymorph neutrophils) was a reliable indication of toxaemia. In order to reduce a complicated series of figures to a simple and more easily comparable form, he had devised a formula by which a single " index " was obtained. He emphasized, however, that the individual findings must also be taken into account. After describing the technique used by him, he gave his conclusions as to the value of the findings. They were particularly useful in forecasting a patient's capacity for work on leaving hospital, and in deciding suitability for and the time to induce an artificial pneumothorax or perform major operations.

Dr. S. ROODHOUSE GLOYNE reviewed briefly all the laboratory investigations of tuberculosis. They fell into four categories: (1) the search for the tubercle bacillus, and (2) the study of those cellular and humoral reactions of the body which denoted its presence. In regard to prognosis and treatment one must also include (3) laboratory tests of the sequelae, and (4) those numerous and indefinable investigations which centred round the search for new remedies of an immunological character. The laryngeal mirror test introduced by Dr. Burton Wood often enabled the bacillus to be found when no sputum was available. The reduction in number and final disappearance of the bacillus after treatment and the presence of involution forms as guides in treatment and prognosis must be regarded with a critical mind. Too little attention was being paid to the naked-eye appearances of the sputum. He considered guinea-pig inoculation superior to the culture method. Concentration methods were valuable in establishing the initial diagnosis, and might help in keeping a watch on the disease. The mechanisms that changed the blood picture in tuberculosis were still not well understood. The picture might be affected by many factors not related to the disease. Much about the tuberculin test was a mystery even now, although the new tuberculin protein precipitate had done something to clear up uncertainties. The test had achieved its greatest triumph in the epidemiological field. Dr. Gloyne then discussed the importance of examining the urine bacteriologically before undertaking major operative treatment on the lung, and of always investigating pleural effusions for secondary organisms.

Dr. PETER EDWARDS (Market Drayton) referred to a method used at the Cheshire Joint Sanatorium of recording by means of an index the sedimentation rate over a period of five hours. He considered the test of immense value. In sanocrysin control twenty-four-hour specimens of urine should be examined daily. At his institution they had found the percentage of bovine bacilli in about a thousand cases to be just over 1 per cent. Mr. L. J. CUTBILL (Market Drayton) described the method of recording the sedimentation rate mentioned by Dr. Edwards. The rate obtained after one hour might be misleading. He mentioned other diluents which might be used in the place of sodium citrate. Dr. MAURICE DAVIDSON asked Dr. Houghton to distinguish between toxaemia and constitutional disturbance. There was need for greater co-operation between clinician and pathologist. Dr. L. S. T. BURRELL said that a small trace of albumin in the urine need not interfere with the continuance of sanocrysin treatment. In the sedimentation test a reading at one hour was less instructive than a curve showing the drop at the end of every hour up to the eighth. He did not agree that the failure to find tubercle bacilli in the sputum even when it was purulent was of no significance. Most of these cases were non-tuberculous. Dr. ENGLAND (Oxford) thought the value of laboratory methods directly proportional to the faith in the result. Dr. GREGORY KAYNE (South Mimms) said that toxaemia and constitutional disturbance corresponded to cause and effect, and there seemed, therefore, little justification for the distinction made by Dr. Houghton. Hypersensitiveness had not been mentioned by Dr. Houghton. Yet this phenomenon, which we now knew to be distinct from immunity and to vary throughout the course of the disease, probably also affected the blood picture. Dr. MCPHAIL (Burrow Hill) stressed the importance of the naked-eye appearance of the sputum. Dr. R. R. TRAIL said that it had not been made sufficiently clear by Dr. Houghton what were the differences drawn between toxaemia and constitutional disturb-

ance. He considered the sedimentation rate still the easiest summation of blood changes for the general physician or medical superintendent; the test should be standardized, however.

Spontaneous Pneumothorax

Dr. R. A. YOUNG opened a discussion on spontaneous pneumothorax. He said that misconceptions had existed until recently about the causes and their relative frequency. Too preponderating a role had been given to tuberculosis. He divided the condition into three categories: pneumothorax (1) in the apparently healthy—pneumothorax simplex, (2) in the course of pulmonary tuberculosis, and (3) from other causes. He discussed the symptoms and signs, differential diagnosis, prognosis, and treatment of each type in turn. Radiology was essential for diagnosis, and lateral or oblique as well as antero-posterior skiagrams should be taken; otherwise many incomplete cases would be missed. Pneumothorax in the apparently healthy had been well described in an interesting and valuable monograph published by Kjaergaard in 1932. The course was benign, but the liability to recurrence was considerable. Spontaneous pneumothorax in the course of tuberculosis varied very much in its manifestations and results. In quiescent or arrested disease it resembled pneumothorax simplex, and its course was benign. In advanced disease death might occur within a few hours or days. Within these extremes were found cases with considerable pleural reaction leading to pyothorax or empyema. A septic pyopneumothorax might occur when the rupture took place over or near a cavity. Some degree of spontaneous pneumothorax from lung rupture also arose not infrequently in the course of therapeutic pneumothorax.

Dr. W. E. LLOYD summarized his observations on forty-three cases of pneumothorax in apparently healthy persons. Exertion did not always precede the onset of the condition: in four of his patients the rupture occurred during sleep. Unilateral emphysema due to fibrosis of the other lung, and the early stage of bronchial obstruction might simulate closely some of the physical signs of pneumothorax. Spontaneous haemopneumothorax was not very rare, but there was no example in his series. Rest was important in the treatment of pneumothorax simplex. The latter was much more common in men, and 68 per cent. of his patients were between 20 and 30 years old. He thought it was unlikely that the rupture of an emphysematous bulla was the cause of the pneumothorax in this group of cases. The association of pneumothorax with asthma was well recognized. He concluded that the results of his investigation emphasized that if a young adult previously healthy developed a pneumothorax which ran a benign course the condition should not be regarded as a manifestation of tuberculosis.

Dr. W. BURTON WOOD gave a review of sixty cases of spontaneous pneumothorax he had seen. Forty-nine of these were men. In only seven of the whole series was active pulmonary tuberculosis the cause. In fourteen instances the pneumothorax was associated with clinical emphysema. Thirty-one cases had to be classed as "simple." Two-thirds of these belonged to the 15-30 age group. For diagnosis skiagrams should always be taken in the erect position. Adhesions rarely followed even when fluid developed in the "simple" type. In only four of the sixty patients did the history lay stress on any special exertion at onset. In regard to whether spontaneous pneumothorax was a manifestation of tuberculosis a verdict of "not proven" must be returned. He thought, however, that an apical tuberculous lesion might primarily be the cause in at least some of the cases.

Dr. BURRELL said that there was often no pain or sudden onset. Patients might complain of increasing dyspnoea, which might have been coming on for weeks or even months. It was remarkable how quickly in the non-tuberculous cases the lung re-expanded when the patient was put to bed, even when the pneumothorax had persisted previously for months. Dr. GREGORY KAYNE referred to two cases of spontaneous pneumothorax with acute onset and abdominal pain which had been diagnosed as perforated peptic ulcer and operated on. Dr. TRAIL pointed to the occasional persistence of a pneumothorax for years. He considered there were more cases due to apical tuberculosis than was generally believed. Mr. TUDOR EDWARDS thought the whole subject required further investigation. Congenital cysts were far commoner than was realized. They were difficult to diagnose radiologically and impossible to diagnose clinically unless the cyst became infected.

SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE

Friday, July 24th

Amnesia

The second session was held with Dr. WILLIAM BROWN in the chair; Dr. R. D. GILLESPIE opened a discussion on amnesia.

Remembering, Dr. Gillespie said, was an active process, including in its fully evolved form a number of functions of which it might be possible to distinguish the following: registration, retention, recall, time ordering, association, feeling of partness, continuity of personal identity, and emotion of belief. A lower level process, sometimes called sensorimotor or mechanical memory, involved only the first three. According to Bartlett's analysis associative (higher level) retention must be considered in the form of schemata, constructed according to the dictates of sense organization, appetite, instinct, and interest in that order of ascending complexity of development. Images were extractions from these schemata. This would presumably mean that personal orientation, for example, in anything but the most elementary sense, depended on images so extracted. The situation, so far as remembering was concerned, was complicated by the fact that words and images became automatized so that their recall was thought to be possible by a process akin to that of recall at the sensorimotor level. Amnesia of some types could presumably occur from disorder of any one of these functional elements. Dr. Gillespie mentioned clinical examples that corresponded more or less with the loss of each one of these functional elements. Amnesia, he said, might be brought about mainly by processes that could be described in a purely physiological way. Psychogenic amnesia was chiefly concerned with hindrances of recall (repression), but the role of automatic repression in the failure of recall, either of earlier or more recent memories, had perhaps been made too exclusive. He adduced evidence on this point bearing both on theories of repression and on the concept of hysterical amnesia. Dr. Gillespie also touched on the differential diagnosis between massive amnesia, due to physical causes such as head trauma, and the similar amnesia due to purely psychological factors.

Dr. D. C. CARROLL dealt with the psycho-analytic approach to the problem. He described the Freudian view of the different parts of the psyche, and said there were three chief causative factors in an amnesia which was not of organic origin. These were: (1) a constitutional factor involving memory-capacity and strength of instinct; (2) conflict in infancy or early childhood, followed by repression; (3) a current stimulus. This classification was important from the therapeutic angle. Radical cure could only be achieved by resolution of conflict and liberation of repressions. Deep analysis was the only way of doing this, but was too lengthy to employ in all cases. Superficial analysis was of little use where the primary repressions were the chief factor. Persuasion had comparatively little value. Hypnosis and suggestion, especially the former, were valuable in all massive amnesias and in hysterical amnesias. The greater in proportion the current stimulus producing amnesia the more was it amenable to treatment by suggestion. In hysteria there might be a very rapid transfer of affect with quite distinctive signs of anxiety. In the absence of these signs it would be safe to say that the case was not one of conversion hysteria. This was a valuable criterion in differentiating the true hysteric from the malingerer.

Dr. FERGUS R. FERGUSON (Manchester) spoke of the difficulties in defining amnesia. He dealt with the differential diagnosis of traumatic amnesia where other possible causative factors, such as epilepsy, alcoholism, carbon monoxide poisoning, and psychogenic abnormalities were also present. He discussed twelve cases in his own practice where amnesia was the main symptom for which advice was sought. The diagnosis of traumatic as opposed to psychogenic amnesia must be based upon a searching investigation, not only in regard to the injury itself, but also in regard to the family history, previous behaviour of the patient, both before and after the accident, the response to psychotherapy, and the nature and content of the amnesia. Dr. Ferguson regarded the following facts as favouring a traumatic origin in cases where differential diagnosis presented some difficulty: (*a*) a normal psychological history, (*b*) absence of mental abnormality in the family, (*c*) no previous history of faints or amnesia, (*d*) normal behaviour before and after the accident, (*e*) severe head injury, (*f*) some abnormal physical signs on examination, (*g*) a retrograde amnesia of not longer than thirty-six hours and a total amnesia of not longer than ten days.

Dr. THOS. S. GOOD (Oxford) described several unusual cases of amnesia treated by him. He preferred the analytic approach. Analysis could be used in mental hospitals with patients who were at a suitable stage. Dr. T. A. ROSS thought that a warning should be given of the dangers of hypnosis in cases of amnesia due to psychogenic causes. There was a grave mental condition in such cases, and the amnesia might be the alternative to suicide. Since hypnosis revealed fantasy as well as past memories all that came out under hypnosis could not be accepted as true. Dr. C. W. SOMERVILLE (Midlothian) said that the largest class of amnesias was post-traumatic. Usually there was amnesia in respect of the actual blow or injury. It was an important medico-legal point that the anterior memory was as good as if the accident had not occurred, and there was no confusion. All our memories were inaccurate.

Dr. TOM WILLIAMS spoke of cases in which memory was lost for earlier experiences and retained for recent events. A foreign language had been remembered and the native language forgotten. Dr. FOSTER KENNEDY (New York) spoke of a man who had lost his memory for seventeen years. Dr. DELICATI (Bristol) referred to the experiences that the novelist, Mr. A. C. Benson had described after a concussion. Sir HUBERT BOND described his own amnesia after a blow on the head. He remembered the blow, but nothing that occurred for some hours after it. He referred to the case of a girl who had a gold necklace melted into her flesh by lightning, with complete amnesia in regard to the whole occurrence.

Dr. DORIS ODLUM stressed the protective value of a psychogenic amnesia. Too sudden recall had in her experience led to suicide and to acute confusional insanity. In analysis the liberation of emotional material should be neither too sudden nor too massive. Dr. DAVID BLAIR (Edinburgh) spoke of a man who remained completely amnesic as to his past life until his death twenty years later. It might have been dangerous to try to restore memory in such a case. Dr. J. R. BENSON (Salisbury) agreed that amnesia frequently had a protective function. Dr. W. MURPHY (Co. Wexford) described his own amnesia following a fall from his horse, with concussion. Dr. HILDA HERFORD (Reading) supported the view that amnesia was often protective. Wise analysis would go step by step with the patient to allow of the assimilation of the liberated emotional material. Dr. WILLIAM BROWN gave an illustrative case showing the risk of recalling an amnesia too quickly. The patient during and after hypnosis developed a state bordering on melancholia.

Dr. FOSTER KENNEDY (New York) read a paper on the organic background of neuroses and psychoses, and urged that our attitude of approach to the problems of the mind should be biopsychical rather than mechanistic. He then reported a series of pharmacological experiments in Bellevue Hospital, New York, on cases of myotonia congenita (Thomsen's disease). These were carried out by Dr. Alexander Wolf and himself on eight patients. Drugs known to have sympathetic and parasympathetic effects were given hypodermically or by vein and results noted. It was found that quinine dihydrochloride in ten minutes entirely abolished all myotonic symptoms, and the result was constant in all these cases of Thomsen's disease. Furthermore, myotonia failed to appear if the patients took by mouth 5 grains of quinine twice or thrice daily. These patients had since been leading lives normal and symptom-free on this "maintenance" dosage. Dr. Foster Kennedy pointed out that myotonia and myasthenia were two diseases of opposed and, as it were, complementary symptoms, and it was found that prostigmine acutely aggravated myotonia, and quinine, in similar manner, aggravated myasthenia. He hoped that this small discovery might lead to new knowledge of the chemical and nervous physiology of muscle contraction. A cinematographic demonstration showed the immediate removal of all myotonic symptoms in a severely afflicted patient by quinine administration.

SECTION OF PHARMACOLOGY AND THERAPEUTICS, WITH ANAESTHETICS

Friday, July 24th

Cyclopropane Anaesthesia

At the second session of this Section, with the President (Professor J. A. GUNN) in the chair, Dr. RALPH WATERS (Madison, U.S.A.) opened a discussion on cyclopropane. He did not propose to repeat what had already been published regarding this gas; his purpose was to describe recent experiences, both experimental and clinical. A suggested new process of manufacture of the gas promised a reduction of the present comparatively high cost of clinical supplies. But it was desirable to ensure that all samples of the gas were free from toxic chemical impurities. Recent work indicated that the constant reduction of gas tension during anaesthesia, due to escape from the blood, might explain in part the widely variant effective concentration necessary for a given degree of narcosis. Cyclopropane caused, as a rule, no respiratory stimulation even during induction. There was a slight depression of this function during the first and second planes of surgical anaesthesia, but, if increasing dosage was gradual, little depression occurred until a concentration was reached that would shortly result in respiratory arrest. Induction with cyclopropane should therefore be as slow as possible. The pulse should be carefully watched because, under deep anaesthesia, there was a risk of ventricular fibrillation. This was usually preceded by an extreme slowing of the pulse rate, followed by either arrhythmia or tachycardia, and these signs indicated that the concentration of the gas should be reduced at once.

In conditions of surgical anaesthesia cyclopropane inhibited, and even arrested, intestinal movement; uterine activity could also be inhibited, and probably abolished, with deep anaesthesia. The post-operative incidence of respiratory complications appeared to be definitely less with cyclopropane than with other anaesthetic agents. After six years' experience with cyclopropane Dr. Waters still considered it an experimental drug, and many things regarding it had yet to be learnt. At the same time he felt justified in continuing its clinical use and recommending it to others who were competent to study its effects and recognize its dangers.

Dr. D. DIVINE (Hull), quoting an experience of ninety-two cases, said he had observed the incidence both of bradycardia and of arrhythmia under cyclopropane anaesthesia. This effect seemed not to be abolished by frequent changes of the soda lime in the carbon dioxide absorber. The gas was easy and pleasant to use. Dr. E. LANDAU stated that cyclopropane had definite indications for thoracic surgery on account of the diminished

respiratory excursion and high oxygenation. Dr. H. J. A. SIMMONS (Bournemouth) mentioned a death under cyclopropane anaesthesia in which ventricular fibrillation was observed. Dr. M. D. NOSWORTHY inquired as to the kind of premedication preferred by Dr. Waters.

Dr. R. BLAIR GOULD had experienced anxiety when using cyclopropane, on account of difficulty in appreciating the depth of anaesthesia. He had observed much more post-operative nausea and vomiting than after ether. Post-operative shock, however, appeared to be diminished. Dr. J. CHALLIS said that when using this gas he experienced severe headache. Dr. O. C. CARTER (Bournemouth) failed to see what advantage cyclopropane presented over avertin and gas and oxygen. The PRESIDENT said that experiments on the isolated gut uncontrolled by experiments on the intact animal were valueless.

Anaesthetics in Labour

The meeting continued in conjunction with the Section of Obstetrics and Gynaecology, and Dr. KATHERINE G. LLOYD-WILLIAMS initiated a discussion on anaesthetics in labour. She stated that chloroform was often the only possible anaesthetic for domiciliary practice, particularly in country districts, but the use of nitrous oxide with air or oxygen was steadily increasing, mainly on account of the low toxicity of this agent. She was not fully convinced, however, that the analgesia so produced was adequate for the actual delivery, and the terminal addition of a small amount of ether or chloroform was often desirable. Injection of morphine, scopolamine, or one of the barbiturates during the first stage of labour gave adequate relief at this time, and these could be preceded by bromide and chloral. If inhalation anaesthesia was begun at an early stage it must be continued until the time of delivery.

During the past three years Dr. Lloyd-Williams had investigated the effect of rectal ether and paraldehyde in these circumstances. The results obtained with the former had been more satisfactory than those with the latter. Rectal ether was preceded by 30 grains each of potassium bromide and chloral hydrate. When the patient became distressed 1 c.cm. of opoidine in 2 c.cm. magnesium sulphate solution was given intramuscularly. If no real relief followed in twenty or thirty minutes rectal ether was given by gravity according to Gwathmey's formula: quinine gr. xx, alcohol ♏ xl, ether ℥ iiss, olive oil to ℥ iv. The injection was well retained, and excellent amnesia and analgesia was obtained usually for from three to four hours. The procedure could be repeated after an interval of not less than four hours. Much the same method was employed for paraldehyde. With a rectal method it was possible to obtain up to four hours' excellent analgesia; the drugs were cheap, safe, and could be kept as stock mixtures. Administration was not elaborate, and the method could be employed for cardiac, toxaemic, or chest cases. The stillborn and neo-natal rates were not increased.

Dr. R. J. MINNITT (Liverpool) stressed the point that analgesia must be differentiated from anaesthesia. The latter condition should not occur under gas and air in the proportion delivered by his apparatus. Sleep was often produced between the actual pains, and this was one of the notable features of the intermittent form of relief given by gas-air analgesia. There was no objection to supplementing gas and air with ether or chloroform at the time of delivery, but in the large majority of normal cases gas and air alone was sufficient. The method should not be employed in the presence of cyanosis, and no blueness should be permitted that did not disappear on breathing normal air. Dr. Minnitt added that his apparatus used about 35 gallons of N_2O per hour, and he demonstrated several portable models designed for midwives.

Mr. L. C. RIVETT was of the opinion that there should always be two trained persons present at every labour. Chloroform was the best analgesic, but a very small percentage of patients showed an intolerance to it. Repeated anaesthesia with chloroform was particularly dangerous. He showed a model of a gas-air machine weighing 15 lb. and designed primarily for midwives. Spanners were eliminated, and control was obtained with handles. It gave excellent analgesia, though in many cases this was not quite enough for the birth of the head.

Mr. LEONARD G. PHILLIPS recommended omnopon and scopolamine followed by nembutal and chloral, which could be repeated. The subject under discussion was complicated by the fact that no two labours were exactly alike and no two women reacted in the same way to narcotic drugs. He doubted if rectal methods could be safely extended over a period of several days, and, in any circumstances, the production of a painless labour as a routine procedure was not devoid of danger. Many drugs now employed were relatively new, and Mr. Phillips drew attention to the older and more tried narcotics such as chloral and scopolamine. It was unwise to promise a patient a painless labour, but suffering should be spared so far as possible.

Dr. H. W. FEATHERSTONE (Birmingham) held that if the patient was to be rendered unconscious a practitioner, free to devote the whole of his attention to the management of the anaesthesia, must be present. Methods available for midwives, therefore, were limited to those which produced amnesia or analgesia without unconsciousness. For this purpose hyoscine was of value, but its effects were variable. The wisdom of permitting midwives, working single-handed, to use chloroform, even in small amounts, was very doubtful. He thought the latest Minnitt apparatus comfortable for the patient, effective, and inexpensive. When tested with a water barometer the suction required to open the valve was considerably less than that required to open the valve on the apparatus described by Mr. Rivett. During crowning of the head a good deal of encouragement was needed to make the mother persist in breathing.

Dr. HELEN E. RODWAY stated that it was unwise to begin the administration of drugs for the relief of pain until uterine contractions were well established, and it was advisable to reserve inhalation analgesia until the second stage. The prescribing of adequate analgesic treatment must always remain the doctor's province, and search for an analgesic agent suitable for administration by the midwife in the patient's home must be continued. The barbiturates resembled hypnotics rather than analgesics, and marked excitement not infrequently occurred. It seemed that rectal instillations of paraldehyde and ether were suitable for the first stage of labour in domiciliary practice, and intermittent inhalation analgesia appeared satisfactory for the second stage.

Mr. C. S. LANE-ROBERTS believed that future developments would be along the lines of more efficient gas-air apparatus. If the patient was breathing properly when using this apparatus he had experienced no difficulty at the actual time of birth. Dr. FRANCIS JONES (Tamworth) described a portable modification of Shipway's ether apparatus in which the patient worked the pump. The results were uniformly satisfactory and the apparatus was suitable for prolonged administration.

Dr. Z. MENNELL was in favour of the proper use of chloroform both as an analgesic and as an anaesthetic; trouble only arose from the fact that it was easily abused. The "fool-proof Junker" appeared to give more frequent satisfactory analgesia than other simple methods. Dr. Mennell was of the opinion that gas and air produced a less satisfactory analgesia than chloroform administered in this apparatus, and he stressed the need for obtaining analgesia as opposed to anaesthesia.

SECTION OF PHYSICAL MEDICINE

Friday, July 24th

Ultra-high-frequency Therapy

With the President, Dr. W. J. TURRELL (Oxford), in the chair, Dr. P. BAUWENS opened the discussion with the paper on ultra-high-frequency therapy (short wave) which appears this week at page 328. Dr. Bauwens illustrated his paper with diagrams on the screen.

Dr. Justina Wilson stated that depth effect and directability were of vital importance in administration of high-frequency currents. The best depth effect was obtained by making the skin electrode as large as possible. As examples of the selective effect of wave-lengths she cited two cases of bronchial asthma. Neither of these responded to wave-lengths of 30, 12, or 6, but with a wave-length of 4.5 one case cleared up dramatically and completely while the other showed marked improvement. In gynaecological work short-wave therapy was greatly superior to diathermy, for the current of the latter took the easiest path and avoided encapsuled organs. Short-wave therapy had great penetrative powers, and tissues acquired a higher capacitative conductance. Diathermy was not without risk in subacute, and danger in acute cases, whereas short-wave therapy gave especially good results in these conditions. Cases of mastitis were particularly satisfactory, incision often being avoided. Short-wave therapy initiated a process of repair and healing in inflamed tissues and degenerated capillaries unequalled, in Dr. Wilson's opinion, by any other method.

Dr. George Cooper (Leeds) said that short-wave therapy did not permit any careless or haphazard methods in application, and all relevant factors needed careful survey. Combination with penetrative *x* rays produced improved results in osteo-arthritis and also, though less markedly, in fibrositic conditions. Short-wave therapy was especially beneficial in superficial septic conditions—for example, carbuncles. Taken as a whole this form of treatment did not show such marked uniformity of results as diathermy, and a good series was sometimes broken. Dr. Kerr Russell dealt with the production of electropyrexia, illustrating his paper with an excellent film in colour. This form of treatment gave good results in sinusitis, especially when the sphenoidal and ethmoidal cells were involved. He gave examples of striking improvement in cases of osteomyelitis. Of sixteen cases of encephalitis all but two showed improvement; unfortunately, however, six months after cessation of treatment this type of case was prone to relapse. Cases of otosclerosis showed no improvement, but disseminated sclerosis and rheumatoid arthritis were definitely benefited, while striking results were obtained in osteo-arthritis, chorea, and gonococcal infections. Of a hundred cases of the last named ninety-two were cured. It was important that this treatment should only be given in hospital, that the physician should induce it himself, and that a specially trained nurse should assist. Labial herpes often occurred after the first and second treatments, and it was necessary to guard against tetany and hyperpyrexia. In short, the greatest care was essential.

Professor Weissenberg (Vienna) described the low-intensity treatment, as practised in the clinic for nervous diseases in the University of Vienna. The part to be treated was placed in such a low field that no rise of temperature was produced: the rest of the body was outside the field. A portable generator had also been constructed to make this treatment available for cases outside the clinic. This low-intensity treatment gave a calming effect, beneficial to sensitive nervous systems. Its indications covered a wide field. It was of value in acute inflammatory processes, especially respiratory troubles and otitis media: the pain in the last condition was soon removed. It was also effective in chronic processes such as rheumatism. It gave striking results in acute neuralgia, neuritis, and sciatica, where heat was contraindicated. Facial paralysis was often cured in two weeks. Other indications included angina, oesophageal spasm, and spastic constipation, the effect of the treatment being comparable to that of atropine and other alkaloids but without their dangers. Since there was no rise of temperature the results of low-intensity treatment must be attributed to a specific electrical effect. With regard to the theoretical explanation it was possible that the nerves acted as rectifiers. Professor Weissenberg illustrated his paper with slides, including examples of experimental work with nerve muscle preparations.

Dr. Nagelschmidt approved Dr. Bauwen's assertion that it was necessary to deal with living condensers. A condenser field consisting of air was not favourable to the production of localized or deep effects. During a recent six months visit to the U.S.A. he had noted that short-wave therapy was much more widely practised in America than in this country or on the Continent: electrically heated sheets and blankets were employed. Dr. Nagelschmidt then described his own researches and experiments concerning the electrical field, an explanatory prelude to his part in the afternoon demonstration.

Dr. Bauwens, in reply, said that many experiments had been performed in an attempt to demonstrate the existence of effects not imputable to heat production. These alleged effects ranged from chemical changes to alteration in surface tension. On purely physical grounds he found it difficult to believe that an agent of so low a quantum value as ultra-high-frequency could be capable of affecting the economy of the active atom or molecule and thus provoking chemical change. There was, however, no reason to suppose on the same grounds that mechanical movements of certain structures took place at high frequency since their existence could be demonstrated at low frequency.

Mild Radium Therapy

Dr. Howard Humphris read a paper on mild radium therapy, alternatively known as radon therapy, emanotherapy, or treatment by radium emanation. Although this therapeutic agent had been employed empirically for centuries, and scientifically for some forty years, it was not sufficiently recognized in this country. Through a confusion of radium emanation with radium or radium salts the idea persisted that radon was dangerous. Indications for this treatment included various forms of gout and rheumatism, certain gynaecological conditions, psoriasis and other skin affections, and chronic catarrh of the upper air passages.

Professor Sidney Russ struck a note of scepticism. Much previous writing on this subject had been merely a matter of surmise. Minute particles of radioactive substances were present in nearly every lake and river in the world. In Sweden the ordinary Stockholm water supply had been found to be more radioactive than the waters of most Swedish spas. Professor Russ adduced experimental evidence to show that the effects of oxidation and detoxication, mentioned by Dr. Humphris, were only produced in infinitesimal amount. From personal experience he combated the suggestion that radon was harmless.

Dr. F. D. Howitt produced clinical evidence in support of Professor Russ's point of view. In a series of patients treated with low doses of radon no difference was noted from tap-water controls. In a series treated with higher doses symptoms were not ameliorated, and the only demonstrable change was a fall in the erythrocyte count.

SECTION OF MEDICAL SOCIOLOGY

Friday, July 24th

Medical Problems of School Life

Sir George Newman, who presided, in an introductory address, traced medical sociology from magic and tribal customs, from Minoan art, 4000 B.C., and from Mosaic law. It was transmitted and transmuted, he said, by the Greek philosophers. Herodotus was full of it, so also were Boccaccio, Shakespeare, Defoe, and Gibbon. The practitioner was the exponent of the social aspect of medicine to his patient: the student's mind should be led into the channels of medical history and sociology. From the earliest times the influence of physicians had been exercised at the Courts of Kings; and in England from 1518 the Government had supported an organized profession for the purpose of benefiting human beings at the hands of the State. Social medicine included sanitation, daylight-saving, one day's rest in seven, public water supplies, religion and social customs, the housing of the poor, the isolation of subjects of infectious disease, the

provision of hospitals, etc. Its effects concerned not only the quarter-million sick in these Islands who required medical attendance each week; they concerned everybody. On the advantages of short cuts in social medicine he offered a word of caution. His list of short cuts included contraception, sterilization of the unfit, a prescribed model diet for the nation, prohibition of alcohol, and medical certification before marriage. It was inexpedient to attempt the compulsion of the nation on such matters. The greatest deprivation in the world was the unjust deprivation of liberty. Social medicine of old was negative—for example, Mosaic law. To-day it was positive. As compassion activated men's conceptions more now than in ancient days so government must become more humanitarian in its purposes. Science had more and more influence in government, which must regard each of the vital bodily needs—material, mental, and spiritual. Not the best but the best practicable was the aim. Nor must government trammel freedom.

Dr. G. E. FRIEND (medical officer, Christ's Hospital) then read a paper on dietetics in relation to efficiency. His paper was printed in full in our issue of August 8th (p. 276). Dr. Friend reinforced his views by reading a contribution from Professor H. E. ARMSTRONG, who went so far as to say the way children were fed in the school period was of greater importance than the education they received; that the multitude of ingredients in a complete diet could only be got by natural foods grown under proper conditions, such as pasture-fed milk where the soil contained the proper ingredients of fertility; that milk must be produced under such conditions that it might be consumed raw; that the use of grass cut as leaf during the growing period and artificially dried opened a new era, and raised the quality of milk produced out of the growing season nearly to the level of the milk in the growing season; that the diet of children was thrown out of balance by the excessive use of sugar, which in the quantities in which it was now used was in no sense a natural food; that the greatest blot on our dietetic conscience was the continued use of white flour; that at Christ's Hospital they had used 82 per cent. whole meal; that boys should be given all the middlings and the bran; that the use of whole-grain meal made into thin cakes as customary among the hill tribes of India was to be generally advocated; that Dr. Friend and he agreed that the protein in the diet was of too uniform a type; and finally that more fish was desirable.

Dr. E. H. M. MILLIGAN contributed a paper on the rationale of free school meals. This also was printed in full in the *Journal* of August 8th (p. 278).

Homework

Dr. WILLIAM BROCKBANK (medical officer, Manchester Grammar School) followed with a paper on homework and physical education. Homework was not a useless and harmful tyranny; most parents and, strangely, most boys working for the higher examinations favoured it. The clever boy enjoyed exercising his powers, and the work was often interesting. Moreover, the boy, thrown on his own resources, found his limitations and his powers. Homework was better in a day school than "prep," which would make the school hours longer. The art of private study was learned by the day school boy; in the boarding school it was not acquired until after matriculation. Further, "prep" in a day school spoiled the outside activities timed to start at the end of school. The average amount of homework set was too little for the clever boy—but he could develop collateral reading—and too much for the slow boy. The parents of the latter should initial the homework at the end of a stated time. Sometimes a master noticed listlessness in a boy, and in this Dr. Brockbank occasionally found homework a factor. Adequate quiet was needed and, above all, ample sleep. The matriculation standard was too high, and the subjects unsuited for the average boy. An examination independent from that set up by the universities was needed for him to ease his burden.

Miss I. M. DRUMMOND (head mistress, North London Collegiate School), in a paper on homework and physical education, said her findings were the same as Dr. Brockbank's although they were arrived at from a different angle. Individual private study made the pupil independent, and if it was remembered that schools were no longer places for intellectual training only, but for physical training, games, and gymnastics also, it would be realized that excessive demands were not made on the powers of children of 14 or 15 or over if some intellectual work was required after school—that is, after 4 or 4.30 p.m. Work done just when school was over, however, was found to lack freshness and inspiration. A complete break and a fresh start at home was preferable.

Mr. F. R. G. DUCKWORTH (H.M. Chief Inspector, Secondary Schools), in a paper on physical education, said one of the chief difficulties was to find room for physical training periods in the time-table. Some people spoke as if time-tables had come from Mount Sinai. They were not sacrosanct. There was a conflict of interests between the physical training specialists, who wanted three periods a week, and head masters, who, though sympathetic, could not afford to give up a period from class-room subjects. At the present moment there were five secondary schools carrying out tests on the lines of one he had made at Liverpool. There the head master had taken two classes of boys of 12 years of age, roughly equal in intellectual ability. While one kept on the school routine the other did five periods a week extra of physical training—that is, a period a day less English or Latin. The boys in the latter group had *not* fallen behind in those subjects from which time had been taken. There seemed agreement now among head masters of experience that at least three weekly periods of physical training were advisable.

Discussion

Mr. A. D. LINDSAY (Master of Balliol), referring to Dr. Brockbank's paper, had a very strong impression that boys to whom scholarships were vital overworked in such a way that they made themselves less able to get the scholarships than boys to whom scholarships did not mean so much. It was only the kind of advice that such school medical officers as Dr. Brockbank could give that would convince parents and school masters of this. He found boys coming up to the university doing well in the scholarship examination and then they were "finished." Thus the arrangements so carefully made by the State that a university education should be available to all boys who proved their worth by reaching a scholarship standard became a vicious circle, for in reaching it they destroyed their worth. He wondered whether it would be possible to do something roughly corresponding to the Rhodes Scholarship arrangements—making the getting of a State scholarship depend on evidence, *inter alia*, that the candidate was not physically exhausted. At present the evidence of progressive exhaustion was shown in this: that among the most brilliant scholarship boys there would be some who would do less well in Mods. and come down in the finals.

Dr. CYRIL NORWOOD (President of St. John's) said the subject of education and physical efficiency was submerged in detail. He agreed with Dr. Brockbank's solution: moderation and common sense. Diet was a matter in which account must be taken of the individual. Institutional diet tended to lack variety. Free time after breakfast, before school, was important, and boys should go direct from school to the main meal. At one school he knew there was a free three-quarter hour between school and dinner. Then a change was made; school lasted till 1 p.m. and dinner began at 1.5. The change cost the school £2,000 a year in extra food: they had eliminated the tuck shop. But there were compensations. The sickness rate was reduced by one-half. After dinner there should be no violent games for an hour and a half.

Dr. W. G. WILLOUGHBY (President, Medical Officers of Schools Association) made a plea for individual care. A normal standard for age should be set and if it was not reached by a boy the reason thereof should be studied and countered. In regard to the extra physical training suggested, the instructors (male) who would be needed

did not exist at present. Physical training should be based on the Greek ideal of control of the body leading to poise and endurance, qualities which were shared by the intellect and spirit. Miss E. M. Tanner (head mistress of Roedean) expressed the view that a girl's mental make-up was different from a boy's, and she needed more protection from overwork.

Dr. E. K. Le Fleming described the "burnt-out" athlete as comparable with the boy who was mentally "finished" when he had attained his scholarship as described by Mr. Lindsay. The greatest difficulty was to assess physical fitness so as to have a basis for estimating results of training and gauging development. Their examination system was wrong. As medical students all doctors had been compelled to learn subjects which afterwards were of no use, and to leave on one side other things which were necessary to their life work. Miss Talbot (Lacock Abbey, representing Miss Florence White, who was unable to be present on grounds of health), said the careful teaching given by the trained teachers of the cookery schools was not in sympathy with the tastes of the people, with whose wishes and habits they had not established contact. The faults of the local dietary should be shown and the people's confidence gained, and improvement in the quality of feeding developed on that basis.

Dr. J. G. Woolham (senior assistant school medical officer, Manchester) spoke on the assessment of physical efficiency. He showed lantern slides illustrating the results of tests of vital capacity, physical strength, and endurance, and of haemoglobin percentage: (*a*) in poor elementary school children receiving free meals and also children of the Styal homes, who showed the same results; and (*b*) in children in "special schools." In these tests the number of children falling within the normal limits and below the normal showed, in the case of the first group, a fairly close correspondence with the "probability" curve; whereas the children of the special schools showed a very marked concentration below the normal in all tests, the concentration in the "normal" zone being conspicuously absent. The difference from normal expectation in *each* of the three tests of the special school was remarkably similar. Dr. Woolham also said that the lifting power of boys in secondary schools in proportion to the weight of the boys (per pound of boy) was less than that of poor class boys of the same age—that is, though the better fed boys could lift more they could not lift as much in proportion to their body weight. He claimed that the use of the three tests together supplied that basis for estimating physical development and the results of training which Dr. Le Fleming had said was so badly needed.

Sir Robert McCarrison said there was one point he was glad to hear emphasized—the great necessity in diets generally of a sufficient supply of vitamin B. It must be remembered that this vitamin was mostly distributed in grain, and the more the grain was prepared the more was it likely to be deprived of vitamin B. Dr. Norwood had mentioned the necessity of observing moderation and common sense in approaching the subject of dietetics, but it was common sense that persons responsible for the school dietary should have regard to the proved facts in regard to such matters as the use of whole meal. Mr. Denny (head master, Wolverhampton Grammar School), comparing the working hours of secondary school boys with those of the same age who had gone into industry, pointed out that the latter put in far longer hours and often did night school work as well, and that without holidays. On the other hand, home work meant a reduction of other activities. There was one thing they could not afford to reduce and that was sleep; the children of poorer people did not get the long and regular hours of sleep that others did. Dr. R. E. Smith (medical officer of Rugby School) spoke of the over-worked boy who went on as if wound up like a clock. When he ran down he could not be got to start again. The undergraduate as a rule worked fewer hours than the schoolboy. To ascertain whether a boy's faculties were flagging the test of the essay was of more value than his memory for mere facts.

MATERNITY WORK IN CHESHIRE

A COLLECTIVE EXPERIMENT

The report of a meeting of the medical practitioners of Cheshire, published in our issue of July 11th (p. 83) calls attention to a new departure in the campaign against maternal mortality which deserves the fullest recognition.

An Ante-natal Scheme

The story of the Cheshire ante-natal scheme was told by the honorary secretary of the Cheshire Local Medical and Panel Committee to a meeting of the (London) Maternal Mortality Committee held last year. This story begins in the town of Winsford, which established an ante-natal centre as part of its maternity and child welfare organization "many years ago." Notwithstanding this provision, no ante-natal work was, in fact, done, because the women would not attend the clinic. Representations were repeatedly made by the local M.O.H. to the visiting inspectors of the Ministry of Health that "Winsford women would go to their own doctors and to them only."

A detailed scheme was drawn up for an ante-natal service by general practitioners, to be paid for by the local authority; the latter was willing, but not the Ministry of Health, which found the proposal contrary to "a certain Act of Parliament." After repeated efforts the consent of the Ministry was eventually obtained, but the Minister stipulated that no payment was to be made for women insured under the Health Insurance Acts as they were, *ipso facto*, already entitled to ante-natal examination by their doctors. Thereupon the local authority increased the fee offered the practitioners from 7s. 6d. to 10s. 6d., and the profession of the town undertook to report upon insured and uninsured alike, though only paid for the latter. Two ante-natal examinations were made by the doctor of the patient's choice, whether or not he was booked to attend the confinement. A schedule of forty questions was answered by the practitioner and forwarded to the local M.O.H. It would without doubt be wrong to assume that the requirements of ante-natal supervision could, in the opinion of Winsford doctors, be fully met by two examinations. But they were all that the authority would pay for and a great advance on the preceding haphazard state of affairs. The woman who got these two examinations was far more likely to get all the ante-natal supervision she should have, for the performance of them awakened interest and quickened a sense of responsibility.

The scheme worked well and was popular with the women. In Dr. Picton's words: "It was soon obvious that we had a magnificent service developing." But after a year or two the control of it passed from the Winsford local health authority to the county council which, anxious to unify its maternity services, represented to Winsford that the transfer would save them a substantial rate. The Winsford Council, however, made a stipulation to which the county agreed: the general practitioner scheme was to be continued unaltered.

After the county council had thus run the scheme in Winsford for some time the Cheshire Local Medical and Panel Committee persuaded the council to try it throughout the county. Its four existing ante-natal clinics were to continue unaffected. This was in 1933, and since then trial has been converted to permanency. In 1935 these were the numbers examined, excluding late returns:

At the centres	406
Under the general practitioner scheme ...	905

When the scheme spread to the county many doctors, in the textile towns particularly, where the married women are often insured, objected to writing their reports gratuitously. That was clearly not a part of their national health insurance duty. The Panel Committee again approached the county council, which agreed to pay 2s. 6d. for the clerical work when a panel doctor reported on his insured patient. Another difficulty that was overcome was this: at first the county council wished to limit

the service to midwives' cases; now it is provided for doctors' cases as well, subject to the usual power of the council to recover a refund from the affluent.

Maternal Mortality Subcommittee

The next step was the setting up by the Local Medical and Panel Committee of a Maternal Mortality Subcommittee to examine the maternal mortality returns for the county and to "make suggestions . . . as to any action advisable." This subcommittee consisted of general practitioners with the county M.O.H. and his deputy for maternity services. The chairman was a general practitioner much esteemed in the county of Cheshire, the late Dr. Richard Turner. This subcommittee investigated the circumstances of all the case histories, sixty-seven in number, which the county M.O.H. had available for the previous three years. The general lines of inquiry were those followed by the Departmental Committee on Maternal Mortality and Morbidity (1932), and a careful search was made in each case for "the primary avoidable factor." Neither names, localities, nor dates were attached to the case histories, so the members received no disclosure whatever as to the persons or practitioners involved. The aim was to review the facts dispassionately without the lurking sense that a brother practitioner was on trial.

Primary Avoidable Factors

It was decided that in thirteen cases the primary avoidable factor was premature application of forceps, leading to obstetric shock, trauma, post-partum haemorrhage, or sepsis. The comment of the committee on these cases deserves to be quoted verbatim: "Probably every member of the committee has frequently employed the low-forceps operation, but the examination of a series of disasters . . . supplies a truer vision of cause and effect . . . and has led us to recast some of our ideas." This comment displays an admirable spirit, at once questioning and teachable—that is, truly scientific—and if the Cheshire doctors continue their work in this spirit they cannot fail to achieve results which will be encouraging to themselves and helpful to the profession at large.

The report which the committee issued in June, 1936, is largely an educational effort, and contains much useful information about matters as widely different as the nutritional requirements of pregnancy and the best artificial medium to employ for intravenous transfusion. In the minutes of the subcommittee (printed for private circulation only and to be regarded as confidential) a summary is given of each of the fatal cases and a digest of the discussion which took place upon it. Some of these summaries and discussions are quoted in the report (which is generally available). The number of cases for study being small it was wisely decided not to attempt to formulate extensive conclusions, but these modest two impressed the committee:

(*a*) That the injudicious use of forceps adds a percentage to the maternal mortality and morbidity. "The masterly policy of inaction" up to a point which clinical wisdom alone can assess is the line to follow.

(*b*) Conversely that in cases of post-partum haemorrhage with retained placenta, bolder treatment, undertaken if need be in consultation—but in that case the decision must be promptly taken—is wiser than prolonged delay. . . . In several of the histories the management of the placenta and the similarity of phrase in which it is recorded suggest that the doctrine of non-interference has been instilled into students without discrimination.

Viewed as a whole the Cheshire investigation contains much to be praised and certain things to be questioned. The great advantage claimed for their ante-natal scheme is that it ensures continuous supervision throughout pregnancy by the medical practitioners of the patients' choice. The Cheshire plan will probably not be generally adopted of necessity, but only if it can be shown to yield better results than are attained elsewhere. The materials are not available for detailed criticism, for the report is obviously to be regarded as preliminary to a fuller account when the scheme has been longer in operation.

Consultant Services

Arrangements are made for the provision of an obstetric consultant at the expense of the county council on the application of a practitioner. The generally accepted view that the services of men who have devoted their professional lives to the subject must form an important element in an organized maternity scheme is regarded by the committee as axiomatic. But it rejoices that Cheshire doctors have not yet become "mere finger-posts to specialists, but deal for the most part with their own difficulties." It further wishes to put in a little practical plea for the general practitioner called in to give an anaesthetic: he is a colleague as well as an anaesthetist, and his opinion is asked on the case. If the upshot of that consultation be *not* to perform the obstetric operation contemplated, the county council guinea is not forthcoming. Thus for a greater, if negative service, he loses his modest reward.

The good wishes of all our readers will be extended to the Cheshire doctors in their courageous experiment, and there will be general recognition of the admirable spirit by which it is inspired.

SOUTH AFRICAN MEDICAL CONGRESS

PROCEEDINGS IN PIETERMARITZBURG

The Medical Association of South Africa (British Medical Association) met for its annual congress at Pietermaritzburg during the week ending July 4th. This was the thirtieth South African congress and the ninth since the local profession was united into its present form. The official opening ceremony was performed in the City Hall by the Administrator of Natal, the Hon. H. Gordon-Watson. He drew attention to the close and cordial relation existing between the Provincial Administration and the medical profession. The enormous increase in the number of patients in recent years was sometimes wrongly attributed to the increase of sickness. This was due rather to the fact that people had realized that more efficient treatment could be carried out in a hospital, where up-to-date facilities provided by modern science were available, and also that forms of treatment had been elaborated which could not be carried out in private houses. The disinclination of natives to take advantage of hospital care had almost disappeared. This was probably largely due to the confidence which they now had in the medical profession. This change of mind had, however, placed a heavy financial responsibility upon the Provincial Administration. Remarkable progress had been made in the Province of Natal in hospitalization since the time of union. He gave striking figures indicating this increase in the case of the two largest hospitals in Natal—the Addington at Durban and Grey's Hospital in Pietermaritzburg. He realized that delegates had a heavy programme of work ahead of them, but before they started on it he wished to pay a tribute to the members of the profession for the work they performed in the interests of the sick poor without pecuniary reward. The Provincial Consultative Committee had recently decided to approve the principle of payment of members of visiting hospital staffs. He was sure that in his Province they would have no difficulty in arriving at a scheme satisfactory to both doctors and hospitals in this matter.

Dr. W. H. Croudace of Pietermaritzburg was thereafter installed as President of Congress, the induction ceremony being performed by the Acting President of the Federal Council, Dr. Karl Bremer, M.P. Dr. Croudace, in his presidential address, "Thoughts on Progress," said that persons of middle age or over had spent their lives in one of the most remarkable periods of the world's history from the human point of view. Remarkable it had been for the magnitude of the changes wrought by man himself in his own environment. Probably at any or every period of time during which the human race had existed there had been a tendency on the part of those living at that particular time to think that pro-

gress and change had been remarkable in their own period, but there could be little doubt that the last fifty years or so had seen greater changes wrought by the application of human knowledge than ever before.

Plenary Session on Abortion

Congress spent the first half of four mornings in plenary session discussing two important subjects. The first of these was "The Ethical, Legal, and Medical Aspects of Abortion," and the second "Should the General Practitioner Operate?" Papers on the former were read by Mr. C. C. Jarvis, K.C., the Attorney-General of Natal, Dr. J. P. Schabort of Johannesburg, Professor W. F. Rhodes of Capetown University, and Dr. S. M. de Kock of Bloemfontein. Mr. Jarvis as a lawyer pointed out that his profession gave a rather different meaning to the term abortion from that understood by the doctor. The crime of abortion was committed by any person who with the object of defeating the ordinary course of gestation wilfully applied to a pregnant woman any means by which the untimely expulsion of the foetus was effected. At present in all civilized Western countries the punishment for this crime was discretionary. No distinction in law existed which depended on the age of the embryo. Two questions of considerable interest to the medical profession arose—namely: (1) whether a practitioner was bound to disclose communications made to him in professional confidence; and (2) the duties of practitioners in relation to cases of criminal abortion. The first question concerned privilege, and the answer was in the affirmative. The second was mainly an ethical question; only under very exceptional circumstances would failure to report the occurrence of abortions coming to his notice be regarded as rendering a medical practitioner liable to be regarded as an accessory after the fact. Dr. Schabort assembled a mass of information, including that from Russia, and asked what must the medical reply be to those who clamoured for legalized abortion in South Africa. Should congress approach the authorities with the request that the law governing abortion be revised or relaxed? In the light of present knowledge such a request would be unnecessary and unwarrantable. Professor Rhodes discussed the medico-legal aspect of the subject and gave some valuable information as to procedures to be adopted under various circumstances. Dr. de Kock outlined the attitude of various sections of the population. Bantus only resort to abortion where pregnancy is undesirable—that is, when the mother is unmarried or when a married woman becomes pregnant prematurely and fears the ignominy of having a child before the time allowed by tribal custom. Both the Dutch Reformed Churches in South Africa hold that abortion may not be resorted to except when the life of the mother is threatened.

After the papers had been read a lively discussion ensued. It became evident that the legal position in South Africa was not by any means clear. In any case of abortion for therapeutic purposes the onus was on the doctor to prove that he had resorted to this measure to save the life of the mother. Doctors therefore might have to face prosecution even if innocent, and for doctors to be hailed before the courts was a very serious matter only slightly alleviated by a finding of not guilty. After much discussion a resolution was passed calling upon the Government to appoint a commission to consider the clarifying of the law on abortion; not only a threat to life but any threat to the health of the mother should be a lawful reason for abortion; abortion should be legalized when a woman became pregnant as the result of rape.

General Practitioner, Specialist, and Public

Another subject which evoked interesting general discussion was introduced by Dr. W. T. F. Davies with a paper entitled "The Relations between the General Practitioner, the Specialist, and the Public." Dr. Davies is President of the South African Medical Council, and speaks with great authority on ethical matters. A paper of this nature from his pen justifiably received the very earnest consideration of congress. The vexed question of the circumstances under which a practitioner should be allowed to style himself a specialist was fully discussed. Eventually the following resolutions were agreed to, with the suggestion to the Federal Council of the Association that they be considered jointly with the South African Medical Council with a view to the taking of necessary action:

1. That a person intending to become a specialist should be required to have been in practice for a certain period of time, so that the general principles of medicine and surgery should be well mastered.
2. That a person intending to become a specialist shall have had a certain period of training at a recognized institution or under a recognized and approved specialist in the same field.
3. That a board shall be set up to decide whether a person who applies for recognition as a specialist shall be so recognized.
4. That a specialist shall be in the position of a consultant in that he may only see cases sent to him by a colleague.
5. That specialists shall be registered and that it shall be an offence for any person to call himself a specialist unless he has been recognized as such and has been registered.

Sectional and Group Meetings

The second half of the mornings were used for the meetings of Sections, and of the groups within the association. The Sections, as in previous years, comprised: (1) Medicine, (2) Surgery, (3) Gynaecology and Obstetrics, (4) Public Health, and (5) Special Subjects. At all of these interesting papers came up for discussion. The meetings of groups were largely devoted to medical politics, matters of great importance to individual members of the groups, such as terms of appointment to public posts. The groups within our association, all of which met at Pietermaritzburg, consist of: (1) District Surgeons' Group, (2) Railway Medical Officers' Group, (3) South African Society of Medical Officers of Health, (4) Ophthalmological Society of South Africa, (5) Radiological Society of South Africa.

Entertainments

The afternoons and evenings were devoted almost entirely to social functions. Honorary membership of the various residential and sporting clubs of the city had been conferred on visiting members, so that ample facilities for golf, tennis, bowls, and other sports were available. There were the usual reception, garden party, banquet, and ball. On theatre night delegates were taken to see the Pasteur film which had recently arrived in the country.

Two courses of lecture-demonstrations will be held at the Medical School, National Hospital, Queen Square, W.C., from October to December, 1936, and from January to March, 1937. These will include demonstrations on anatomy, physiology, and pathology, and demonstrations on post-mortem material, at 12 noon; lectures on the principles of neurology and on diseases of the nervous system, at 3.30 p.m.; demonstrations on clinical methods of examination, at 5 p.m. The autumn course from October 5th to December 4th, 1936, includes twelve lectures on the principles of physiology of the nervous system and its applied anatomy; thirty-six lectures on the principles of neurology; nine demonstrations on the general pathology of the nervous system; nine demonstrations of clinical methods of examination in diseases of the nervous system. The winter course from January 18th to March 19th, 1937, includes ten practical demonstrations in anatomy; thirty-six lectures on diseases of the nervous system; nine lectures on pathology; six lectures on physiology; demonstrations in neurological ophthalmoscopy and otology, and re-educative exercises and orthopaedic treatment in disease of the nervous system. The fee for each course is £10 10s., and special arrangements will be made for those unable to take the whole course.

New Zealand

[FROM OUR CORRESPONDENT IN WELLINGTON]

The N.Z. Hospital System

The New Zealand system of hospital finance has always awakened interest throughout the Empire. It was roundly condemned by the President at the Annual Meeting of the British Medical Association at Melbourne. It is a good system, however, within limits, but apparently these limits are now being exceeded. Briefly, the public hospitals of New Zealand are maintained by Government subsidies, by local rates, and by patients' fees. The fees charged are not nearly sufficient to cover the cost of maintenance, and a large proportion of the patients who receive either in-patient or out-patient treatment pay nothing at all. To add to the difficulties of the situation, so far as ratepayers are concerned, the means test for out-patients at the Wellington Hospital has been abolished. According to the Hospitals Act and to the practice of the controlling authorities of the larger hospitals the wards of public hospitals are open to all classes of the community, rich and poor alike. Great building schemes are in contemplation. A consulting architect has said that £1,250 is nowadays by no means too large a sum to spend on the capital cost of a bed in a public hospital. The hospitals are developed to a high state of efficiency as regards equipment, all at a corresponding rise of expenditure not originally contemplated. A forty-hour working week has been ordained by the new Government in power, and wages have been considerably increased. In the Wellington Hospital, for instance, last year's expenditure for salaries and wages was £62,448, but this ensuing year it will be greatly increased, for the item for the wages of porters alone is increased by 40 per cent. in the Hospital Board's estimates.

Many ratepayers, having regard to their mortgage commitments, are in no better position than rentpayers. Landlords are forbidden to increase rents except by permission of a special tribunal. Property ownership has been extensively socialized through the system of State lending for homes on very narrow margins of security, with the result that the average wealth of ratepayers is lowered. The burden of rates, moreover, apart from the cost of maintenance of hospitals, has increased through the development of other social services and schemes of municipal progress.

Under these new conditions there is ground for demanding that the responsibility of the community as a whole for the upkeep of hospitals should be seriously considered. It might be argued that this would mean the complete nationalization of public hospitals, but in any case this is likely to result. There is no reason, however, why local control should not continue under a system of hospital maintenance from general taxation, and a precedent for this arrangement is in the education system. It is hard to detect any difference in principle between the State paying the whole cost of schools and paying for what hospitals cost over and above amounts recovered from patients. Local districts in New Zealand would resist any attempt to rate them for education, although this system is in vogue in other countries.

Financial Problems

The burden on ratepayers for hospitals and for all local municipal and borough services is inequitable. It is doubtful if the Government can, or will, shoulder the whole cost. It is doubtful if the increasing costs of hospitals in New Zealand are not extravagant. Too much accommodation may be provided, too much duplication, too much overlapping, and perhaps not enough use is being made of base hospitals and cheaper accommodation for chronic and convalescent patients. More home nursing and district nursing may be required. Paying wards would help to relieve the situation, but they are said to be undemocratic ; apparently first-class and second-class accommodation on Government trains and steamers is democratic. It is all very difficult, but the crux of the situation is the delusion that any type of hospital finance can easily be made proof against increasingly mounting expenditure. There may possibly be reached a stage of expansion when even a State, with all its powers of taxation, will find its financial burdens too great to bear. The situation in New Zealand is an interesting one. An originally well-devised experiment is now being tested in the light of a different situation, and the whole question will be further complicated, or may be settled, by the establishment of a State medical service and compulsory health insurance. The tendency towards the abolition of honorary staffs and the substitution therefor of paid full-time or part-time surgeons and physicians will in itself mean a large expenditure by hospital boards. At the present time the four large metropolitan hospitals require new *x*-ray machines for treatment, and suitable housing for these machines. This will lead to an aggregate expenditure of £36,000, and the Otago Hospital Board is asking assistance from the New Zealand Branch of the British Empire Cancer Campaign Society—a voluntary organization.

Scotland

The College of Physicians' Laboratory

The Laboratory of the Royal College of Physicians of Edinburgh, which publishes its annual report for 1935, is now in its forty-sixth year. During the period under review 15,760 specimens were examined, an increase of 407 over the 1934 figure. Statistical research into the data affecting mortality from appendicitis has been continued from the previous year. It is concluded that the principal underlying factor in determining the death rate in cases of acute appendicitis treated by operation is the same " vitality " which manifests itself in the general death rate. An analytical review of the results of antirabic treatment in Pasteur Institutes in all parts of the world, dealing with more than half a million persons, showed only an insignificant variation of mortality rate in cases treated by different methods. The mortality rate was 0.16 in Europeans and 0.72 in non-Europeans. In histopathological work special attention was paid to malignant conditions, notably Paget's disease of the nipple. In parasitology a study was made of the causes of Calabar swellings, revealing in many cases not *Loa loa* but *Filaria perstans* as the causative organism. In chemotherapy research has been devoted to the synthesis of compounds allied to atebrin. Clinical and laboratory observations were carried out on " calgon," a complex metaphosphate, capable of dissolving insoluble calcium precipitates. It was found that, although this substance is successful in removing incrustation from boilers, it was ineffective in the case of stones in the kidney and bladder, but irrigation with calgon in cases with suprapubic drainage gave promise of reducing rapidly forming deposits. Eight publications were issued from the laboratory in the course of the year.

Scottish Mental Hospitals' Pathological Scheme

The thirty-eighth annual report of the Scottish Mental Hospitals' Pathological Board states that the income for 1935 was £1,044 with an expenditure of £1,107. The report of the director, Professor A. Murray Drennan, shows that this joint scheme for research in connexion with the physical basis of mental disorder has been particularly active during the past few years. Dr. Biggart had continued his investigations of the pituitary gland, and had published a textbook, *The Pathology of the Nervous System*, which was an adequate justification of the ideals in which the joint research scheme had its origin. The laboratory had dealt with a large amount of routine work, especially pathological examinations, and

Dr. Biggart had visited contributing mental hospitals, conducted forty-four post-mortem examinations, and examined in all over 200 brains, apart from other specimens. A large museum for naked-eye study was being gathered, and several complete sets of slides showing varieties of neurological lesions were available at a nominal cost for the medical officers of contributing hospitals.

England and Wales

Science and Traffic Safety

The British Association for the Advancement of Science will meet this year in Blackpool from September 9th to 16th. Following the discussion held at the Norwich meeting in 1935, at which the Minister of Transport and the Commissioner of Police were represented, the Engineering Section of the Association has arranged that at the Blackpool meeting more detailed consideration shall be given to the technical factors involved. Mr. E. H. Fryer, deputy secretary of the Automobile Association, will read a paper on September 14th entitled "The Application of Science to the Solution of Road Users' Dangers and Difficulties." There will then be a general discussion, followed next morning by a paper by Dr. Stiles dealing with headlight glare and illumination in fog, and one by Mr. Batson of the Road Research Department. In the Section of Physiology, on September 11th, a paper will be given by Dr. H. M. Vernon on the relation of alcohol to road accidents. The British Association is anxious to obtain constructive suggestions as to the ways in which the car itself or the road could be improved in the interest of reducing traffic risks. Many such suggestions will no doubt be put forward at the meeting, but constructive suggestions in writing will be welcomed by the Recorder of the Engineering Section—Wing-Commander Cave-Browne-Cave, University College, Southampton. Full particulars of the meeting, with terms of membership, may be had from the secretary, British Association, Burlington House, London, W.1.

Dust Prevention in Mine Workings

At the summer meeting of the Institution of Mining Engineers, which was held at Bath on July 22nd, two communications were made touching on the silicosis problem. Mr. Ivon Graham of the Mining Research Laboratory, Birmingham University, described investigations which have been proceeding during the past four years on behalf of the British Colliery Owners' Research Association for the purpose of ascertaining the average quantity of free silica suspended in headings and other underground places where mining operations have to be carried out in hard rock. The tests have formed part of a general investigation of the causes of silicosis in coal mines. The pits chosen for the test have in nearly every case been those where certified cases of silicosis have occurred, and include some in Kent, Lancashire, Somerset, Staffordshire, and South Wales. The primary object of the work was to obtain information with regard to the actual amount of free silica in the air, and for this purpose sufficient dust for chemical analysis had to be obtained. The results showed a big variation in the production of dust in different cases, but where the rock was damp the amount of fine dust formed was not excessive, and Mr. Graham and those working with him accordingly suggested that much could be done by keeping all material as moist as possible and using the latest form of Hay dust-trap. Where wet drilling was employed and there was efficient ventilation of the headings the concentration of dust was reduced to a very low figure. In another paper given to the same meeting Mr. Ivon Graham, with whom Mr. D. G. Skinner was associated, discussed the composition and fineness of powdered materials used for stone-dusting in coal mines. The paper was based on an examination of forty or fifty samples of stone dust from collieries producing about forty million tons of coal per annum. The results showed that the proportion of dust particles of physiological significance, although much higher than at first supposed, might, with ordinary means of grinding, be kept down to a reasonable level. Although there was no evidence, said the authors, for the production of true silicosis from the inhalation of any stone dust containing less than 35 per cent. free silica, yet breathing in atmospheres containing a high proportion of dust particles was objectionable, and it seemed possible that such atmospheres, either alone or in conjunction with other factors, might be responsible for the production of chronic bronchitis. Every underground factor contributing towards bronchial complaints should be eliminated so far as possible, and in this connexion the degree of fineness to which stone-dusting materials should be ground was a matter for full discussion. It appeared from the tests that many materials were now being ground to unnecessarily fine powders, which were objectionable from the physiological point of view.

Thoracic Surgeons at L.C.C. Hospitals

Some rearrangements have been made by the London County Council in the provision for thoracic surgery at its general hospitals. The staff of thoracic surgeons will in future comprise one position of honorary chief surgeon and two positions of thoracic surgeon. The two thoracic surgeons will attend at the unit as necessary, but not more frequently than for four sessions a week in all. Until the needs of the unit can be assessed each of these officers will be paid by visits, and it is proposed that they each receive three guineas a visit on the understanding that during any year the payments made to each officer shall not exceed £150 for the first fifty-two visits, shall be limited to £240 in respect of 104 visits, and during a year shall not in total exceed £330. From October 1st next the thoracic surgery unit will be centralized at St. Mary Abbots Hospital, Kensington, but the existing arrangements for the services of thoracic surgeons at general hospitals other than St. Mary Abbots will be continued.

Coroner's Law and Practice in London

Since 1919 it has been the practice of the London County Council in appointing coroners to require of candidates both a legal and a medical qualification. Having regard, however, to the recommendation of the Departmental Committee that in future only solicitors or barristers should be appointed as coroners, it is proposed to discontinue the requirement of a dual qualification in relation to future appointments. With regard to other points in the report of the Departmental Committee, the Mental Hospitals Committee of the Council states that the adoption of the recommendation that the coroner should have discretion to dispense with an inquest in certain cases of death in a mental hospital or certified institution would not be likely to occasion a material change of current practice, since coroners do not usually hold such inquests unless there are circumstances which really call for inquiry. The adoption of the recommendation that post-mortem examinations ordered by coroners should be performed by pathologists on a Home Office panel would determine the present arrangement whereby post-mortem examinations are usually entrusted to one of the medical officers of the institution concerned, but this independent examination would serve as a safeguard to the Council's medical staff. On the general question of post-mortem examinations (not in mental hospitals alone) it is stated that for many years a panel containing the names of skilled pathologists has been kept by the Council for the use of coroners. The Departmental Committee recommends that the statutory fee for a post-mortem examination should be raised from two to three guineas, and that all local authorities should exercise their powers under the Coroners (Amendment) Act, 1926, to prescribe higher fees for pathologists. In the schedule of fees made by the London County Council there is provision for fees not exceeding seven guineas to be paid to expert pathologists and toxicologists for special examinations in response to requests made by coroners. The Council does not propose to take any action on the report of the Departmental Committee.

Examination of Chinese Liquid Eggs in Bristol

The report for 1935 of the preventive medicine laboratories of the Bristol Health Committee is chiefly devoted to investigations of milk, eggs, and ice-cream. Routine examination of milk showed a marked improvement in quality over the previous year. In the case of pasteurized milk, for example, only 3.3 per cent. of samples examined failed to comply with prescribed conditions, as against 40.7 per cent. in 1934. Examination of 519 samples of milk for tubercle bacilli showed their presence in thirty-eight instances, or 6.8 per cent. With regard to ice-cream about 50 per cent. of samples showed an excess of bacillary contents: 52.4 per cent. of those examined yielded positive findings for *B. coli* in 0.1 c.cm. Special attention was paid to Chinese liquid eggs, of which 800,000 cwt. were imported into the United Kingdom in 1934. Chemical analysis showed that their nutritional value compared favourably with the new-laid product. Bacillary findings, however, demonstrated the frequency of *B. coli* and spore-bearers, and suggested the possibility of the inclusion of Salmonella and dysentery groups in certain circumstances. As these eggs are chiefly employed in confectionery, samples of cakes were examined, and it was found that in all cases the heat used had destroyed the *B. coli*, but not the spore-bearers, staphylococci, and some streptococci. This is not a direct menace to health, but it minimizes the keeping properties of the cakes. A control cake, made with English new-laid eggs, showed a negligible bacteriological content. The report also contains a differential table of pathological and bacteriological examinations performed during the year.

India

Obstetric and Gynaecological Congress

The first All-India Obstetric and Gynaecological Congress was held at Madras in January under the presidency of Dr. Ida S. Scudder, principal of the Women's Medical School, Vellore, and the published *Proceedings* have now been received. Delegates attended from French and Portuguese India as well as from all parts of British India and from various Indian States. The chairman of the Reception Committee, in his welcoming address, remarked that Madras claimed to have the oldest maternity institution in British India (the Government Hospital for Women and Children, founded in 1844), to have instituted the first training school for midwives in the Indian Empire, and to have established the first post-graduate school in obstetrics and gynaecology, while the University of Madras was the only one so far which had created a diploma in the latter specialty. Miss Scudder, after explaining how the congress had been brought into being under the joint auspices of the Bombay Obstetrical Society and the Obstetrical and Gynaecological Society of Madras and South India, pleaded for the establishment of an Indian obstetrical and gynaecological journal, particularly in view of the help which could thereby be given to practitioners in villages in dealing with their special difficulties and emergencies. The *Proceedings* contain twenty-four of the papers read ; among the subjects dealt with are atonic post-partum haemorrhage, problems relating to the placenta, pelvic disproportion, Caesarean section, uterine haemorrhages and displacements, and child welfare schemes. Brief notes are also given of the ensuing discussions, from which it is obvious that practical considerations were kept well to the fore and that many constructive criticisms added zest to the meetings. At a business session a resolution was passed urging the inclusion in the medical students' curriculum of a course of six months' training in an obstetric and gynaecological hospital or in an obstetric and gynaecological ward and out-patients' department in a general hospital—three months in the penultimate year of training and three in the final year. Each student should be required to conduct personally twenty cases of labour, five under supervision in a maternity institution. The next congress will be held in Bombay during the Christmas season 1937–8. The subjects for discussion will be the toxaemias of pregnancy and cancer of the cervix. Rules were framed for the creation of a permanent organization to carry on the congress business between its sessions.

Kashmir Mission Hospitals

The report for 1935 of the Kashmir Medical Mission of the Church Missionary Society contains a review of the work during the year at the Rainawari Mission Zenana Hospital as well as at the larger hospital at Srinagar. The former institution was transferred to the Church Missionary Society from the Church of England Zenana Mission Society, and is now being rebuilt ; it is hoped to reopen it next October. The outstanding event in 1935 was the cholera epidemic from July to September. The Rainawari Hospital was made one of the inoculating stations, and it was found necessary to establish expeditionary parties to arrange for inoculation in the homes of the local inhabitants. Eventually about 80 per cent. of those living in Srinagar and the villages of the valley were protected against cholera ; no fewer than 1,400,000 inoculations were performed, and this is claimed as a " world record " for any one State or Province. The epidemic reduced the number of out-patient attendances at the Srinagar Hospital and of admissions, mainly due to the restricted movements of the country population ; the total of major operations fell by about 100 from the 1934 figure to just under 700. Osteomyelitis remains the commonest complaint, and a further experience for one year of the Winnett Orr method of treatment has convinced the hospital staff of its great value ; it is now being tried in cases of compound fracture. Dr. Cecil Vosper contributes to the report an account of a 400-mile tour in the remote province of Baltistan, situated at the northern end of the Himalaya and the Karakoram Mountains. Over 2,000 patients were seen, and 190 major and minor operations performed. About fifteen miles were covered each morning, the remainder of the day being spent in treatment. As a rule only one night was spent at each of the various halting places, but at both Kargil and Shigar several days were necessary to deal with the surgical work.

Ireland

Ophthalmic Examinations in County Galway

Dr. Conor O'Malley, ophthalmic and aural surgeon to the Galway County School Medical Service, has submitted his ophthalmic report for the year 1935. The total number of examinations undertaken during the twelve months was 456. Out of 435 children with errors of refraction requiring glasses no fewer than 142, or approximately 33 per cent., were found to be suffering from various eye diseases as well. Thus almost one child in three requiring glasses had some eye disease that called for medical treatment. Many of these children need prolonged supervision and co-operation on the part of the parents if their eyesight is to be saved. Appended to Dr. O'Malley's report is the following analysis of eye diseases and errors of refraction treated.

Various Eye Diseases

	Cases
Squint	90
Corneal nebula	10
Blepharitis	14
Cataract, traumatic... ...	—
,, congenital ...	4
Old iritis	1
Retinitis pigmentosa ...	2
Amblyopia ex anopsia ...	11
Trachoma, acute	2
,, old	2
Congenital glaucoma ...	1
Myopia over 5 degrees ...	5
Total	142

Errors of Refraction requiring Glasses

	Cases
Hypermetropia	182
Compound hypermetropia...	115
Myopia	33
Compound myopia	80
Mixed astigmatism	75
Total	435

The County Galway School Medical Service instituted a system of home and hospital treatment for squint during 1935, with satisfactory results.

CORRESPONDENCE

Parting Good Wishes

Sir,—On the eve of my departure for Australia may I be permitted to convey my congratulations to those who undertake the heavy business of our Association on the great success of the Annual Meeting at Oxford.

As the President, Sir Farquhar Buzzard, stated, never has the B.M.A. been so strong as it is to-day. If it is handled in the future as it is to-day, with restraint and dignity, its strength is certain to increase, as everyone feels it is upholding the great traditions of a great profession. It contains one member in five who lives over-seas and one in seven who lives in Australasia. This world-wide character is likely to increase. It makes not only for common ideals and methods in the world of medicine, but also for a better understanding of the nature of an Empire which stands for Peace, Justice, Liberty, and that which without those things would be useless—namely, Responsibility.

The address by the Chairman of the Council (Dr. Le Fleming) was an education in the value of the tour conducted to Melbourne in 1935, which is memorable in our history and may, I hope, be repeated to some part of the Australian continent.

My warmest thanks are due to those who at Oxford treated me with such kindness and generosity. My reception at the meeting of the Representative Body moved me deeply, and I shall tell my colleagues in Australia that the warmth of feeling evidenced made the difficulties of a 13,000-mile journey fade into insignificance.

Again I desire to convey to all concerned thanks too deep for verbal expression.—I am, etc.,

London, S.W., Aug. 10th. James W. Barrett.

Tuberculosis Contacts

Sir,—My attention has been drawn to the report in the *British Medical Journal* of July 25th of my speech at the recent Annual Conference of the National Association for the Prevention of Tuberculosis, when the subject of tuberculosis contacts came under discussion.

I wish to point out that two errors have crept in. I am reported as indicating that the number of contacts in London is 6,000. The figure I mentioned (based on 2.5 contacts to every case on the dispensary registers and a five-year supervisory period) was 60,000, and it was in consequence of this very high figure that I felt it wise to draw attention to the necessity for selectivity in regard to contact investigations in the future. Further, there is a minor error in the report in so far as I am recorded as saying that 66 per cent. of the total number of sputum-positive females requiring residential treatment are between the ages of 16 and 30; the figure I mentioned was 60 per cent.

May I refer also to the curious statement interpolated in the paragraph dealing with my speech. After indicating that I said out of 4,195 child contacts examined in London in 1935 only 1 per cent. were found to be suffering from pulmonary tuberculosis, there appears the following sentence within brackets:

> "It is to be noted in this connexion that tuberculosis is apparently not considered (as it should be in children) a general systemic disease, an active focus anywhere in the body requiring treatment as a preventive measure against phthisis later."

It is a little difficult to understand what your contributor means. I was dealing at the time, as clearly stated, with the number of child contacts found to be suffering from pulmonary tuberculosis. A further number of children amongst these contacts were of course found to be suffering from non-pulmonary tuberculosis, and a considerable additional number were found to be debilitated and were sent away to convalescent homes, whilst still others were removed from infection under our boarding-out scheme. I, personally, do not know anyone, in London or elsewhere, who considers tuberculosis to be a purely local disease.—I am, etc.,

London, July 31st. F. J. Bentley.

*** We much regret the two errors pointed out by Dr. Bentley. The report had to be published soon after the conference, and it was not possible to send out proofs for correction. Perhaps, however, the statement in the report, "since with the existing organization it would be impossible to tackle all the contacts," will have made it clear that the figure of 6,000 printed could not have been that given by Dr. Bentley.

Treatment of Tetanus

Sir,—I thank Dr. Leslie Cole for his letter (*Journal*, July 18th, p. 151) giving further information as to his series of cases of tetanus (*Quart. Journ. Med.*, July, 1935).

I was specially interested in the cases with severe wounds which terminated fatally. I had assumed that these cases had received the treatment which he recommends in general—namely, active surgical treatment to the surface of the wound. I find that I was mistaken in this assumption, since these particular cases had in fact received no surgical treatment at all, owing to the gravity of the symptoms on admission.

In Dr. E. M. Fraenkel's subsequent letter (August 1st, p. 259) it is recommended that amputation should be performed, or alternatively excision of the wound. Amputation is only suitable when the operation site is well above the infected area; and excision is clearly only applicable to cases in which the wound is obviously of limited extent. There remains a group of cases in which neither amputation nor excision are practicable owing to the site and magnitude of the infected area. In war, at any rate, such cases are not unusual. My experience has taught me that cases of this nature may recover under antitoxin treatment provided that the surface of the wound is not disturbed. I should be interested to learn whether there is any record of such a case which has recovered when the wound has been surgically treated subsequent to the development of tetanic symptoms. Neither Dr. Cole's nor Dr. Fraenkel's records include such a case.—I am, etc.,

Sheffield, Aug. 6th. R. G. Abercrombie.

Ophthalmoscopic Signs of Death

Sir,—Referring to the article by Dr. Melvin and myself in your issue of June 20th (p. 1249), I wish to thank the writers who have called our attention to previous literature on the subject and to offer our apologies to any author whose work we have missed. Slight condensation at the beginning of the article has unfortunately completely altered the meaning of the opening paragraphs. Quotations from the original will be made below, with a few explanations.

> "It has been a repeated clinical observation . . . that definite *changes* [intentionally plural] . . . appear in the retina of the dead or dying patient.
>
> "(*a*) One can see the actual movement of the column of blood in the retinal veins. [Not under normal conditions, as the revised article would appear to suggest, but only as part of the phenomena of death.] To begin with, one is merely conscious that the stream is in motion, then it seems to become slightly irregular and 'lumpy.' . . . "

"(*b*) After all movement has ceased the interrupted columns are still plainly visible. . . ."

We wished to definitely separate two phenomena: first, the visible movement with increasing fragmentation; secondly, the residual picture of fragmentation without movement. The comments in the issues of June 27th and July 4th would seem to indicate familiarity with the second stage only. Limited to this, the test is a good sign of death, but nothing more. Additional uses suggested in our article depend upon the changes of the first stage. Those changes are, we maintain, plainly visible, and constitute, in our opinion, the earliest and outstanding ophthalmoscopic signs. Some further observations have been made and new experimental approaches planned, and we hope to have a supplemental report ready shortly. In it an attempt will be made to correlate the discrepancies in different descriptions and to link up still more closely the clinical observations with experimental investigation.—I am, etc.,

C. R. SALSBURY.

Petawawa Military Camp,
Ontario, July 23rd.

Lister's View of Inflammation

SIR,—It is very refreshing to find someone bringing to notice one of the most important of the researches of the late Lord Lister. I thank Sir Lenthal Cheatle for having done so in his Hunterian Oration (*Journal*, June 6th, p. 1148). Sir Lenthal points out that Lister's concept was "directly opposed" to that of Hunter. We may gather confirmation of this fact from Lister's written word. He tells us that upon his appointment as lecturer in clinical surgery at Edinburgh he felt in duty bound to follow custom and make inflammation the subject of his opening address to the students. He also tells us of his mental perturbation at the thought that at the moment no clear conception of the processes of inflammation existed. It was entirely foreign to his nature to be the man who would disguise the prevailing ignorance on such an auspicious occasion, so he set to work to discover all the truth that the means at hand and his comprehending mind could reveal. There were six weeks to do it in, and he did it! I think we must admit that very little of great moment has been added to the knowledge of the subject that Lister gave us, and certainly nothing to controvert his findings.

I would like to explain why I believe that Lister regarded inflammation as a process of repair from start to finish, that it consists of regrowth guided and controlled by the laws of growth, but that would encroach unduly on space. Permit me to suggest to your readers that they should read the original and go from Lister's reports of researches carried out in his humble and simply equipped laboratory in his home to his clinical lecture "On the Management of a Large Open Wound (*Lancet*, 1879, ii, 901).—I am, etc.,

A. C. F. HALFORD, M.D., F.R.A.C.S.

Brisbane, Australia, Aug. 21st.

The Medical Curriculum

SIR,—In the recurrent controversy about the medical curriculum little is heard from those who would regard the introduction of novelties with grave apprehension or the suppression of certain subjects as schismatical. If change be expedient, primary education calls most loudly for reform. The faculty is far too easy to enter. The course is not overburdened or too long. While lectures and clinics are calculated by the clock, vacations are reckoned in months. It is a platitude to refer to the average student's nonchalant attitude towards many things that matter and which, in the public eye, are sacrosanct, for his prodigality has been proverbial since the days of Dickens.

Your correspondent who would modify the concluding phase of the course seems unmindful that diagnosis and treatment of disease are the physician's primary—and ultimate—task. His concern being less biological and chemical than medical, amendment, if its exponents prove adamant, might begin at the beginning. The mission of the doctor needs no defining. The advocates of reform seem over-sceptical of the competence of contemporary specialists. Students cannot predetermine their professional status. Not until the curriculum is completed can the neophyte judge of his own propensity, predilection, and capacity. It is invidious to ask how an aspiring oculist or gynaecologist could achieve perfection with an attenuated knowledge of those pathological conditions often incidental to his more immediate problem. It is difficult to envisage the future pathologist's command of confidence if he is ignorant of the wide scope of medicine. Therapeutics could have no practical application without clinical experience. He would be an ambitious student of divinity who only contemplated his ecclesiastical progress in terms of the archiepiscopal. The parallels are infinite.

In the instance of osteitis fibrosa cystica which Dr. Sanguinetti so airily quotes, the finished product of his decimal system of degrees would, it seems, formally convey to his trusting patient the humiliating intelligence that his ability was strictly circumscribed and his practice confined to the commonplace. This case would, as ordinarily, be referred to the expert, but the general practitioner would not be excused for his admitted professional limitations. Such a confession to a patient might be made in confidence, but the patient's disregard of it would not conduce to his physician's reputation or professional profit.—I am, etc.,

JOHN SHIEL, L.R.C.P., L.R.C.S.
Barrister-at-Law.

Dublin, Aug. 2nd.

Preliminary Qualification for Medical Students

SIR,—At the risk of a charge of effrontery I desire to challenge the view of a seasoned educationist like Pro-Vice-Chancellor A. H. MacKenzie of the Osmania University. While acknowledging the most handsome tribute he has paid the medical profession in his letter in the *British Medical Journal* of June 27th (p. 1324), "From my own knowledge, intimate and extensive, of medical men I can say that their standard of intellectual interests is in no sense inferior to that of members of other professions—teachers, lawyers, or clergymen," this seems to me to err on the side of charity. I should welcome the resolution of the General Medical Council to include in the pre-registration examination "one or two subjects of general education at a higher standard than that of the preliminary examination." Dr. MacKenzie discountenances the proposal for three reasons:

1. That it will "overburden the student." I rather feel that the already burdensome curriculum with a number of purely scientific subjects will be rendered a yoke easy and a burden light by the incorporation of subjects of non-scientific but of "general cultural" value. As a teacher of the principles and science of treatment in medicine in a medical school training for the degree, I have noted a certain incapacity of apprehension on the part of the student when expressions such as "the art of treatment," "treatment in Stone and Iron Age," "empiricism and rationalism," "sanction of Galen," "treatment based on humoral theory." "Alexandrian school," are used. One would think that the "one or two subjects of general education" will go some way to help the students in this situation.

2. Dr. MacKenzie is of the view that having chosen a scientific profession the practical outlook of the student may be undermined by the inclusion of subjects of literary or metaphysical value. "Having chosen their profession they are interested only in subjects which will help them to achieve success in it." As a member of the profession I take good care not to smother or stifle tastes or any interests that rise in my colleagues or myself that are other than the ones calculated purely to achieve "success" in it. Dr. MacKenzie would do well to read this year's Linacre Lecture by Lord Moynihan (*British Medical Journal*, May 9th, p. 944), where one finds that the profession is proud of the truants who achieved celebrity in fields other than their own. But to read, "To force cultural subjects on them at this stage is therefore to defeat the purpose in view," made me pale. The answer to this is given by *Pygmalion or the Doctor of the Future*, who feels that the future of medicine rests with the physician of general outlook as opposed to the specialist or the pure scientist. "The doctor of the future will not, as is now assumed, be a thorough scientist of the orthodox type; a man with the technique of the laboratories at his finger-ends. . . . Rather he will be a humanist, a man with the widest possible outlook and a high level of average knowledge of human nature." Does Dr. MacKenzie think that including "one or two subjects of general education" will not conduce to this?

3. Most certainly culture is not the same as knowledge, as Dr. MacKenzie observes; but does not culture derive nourishment from knowledge? A mind fed purely on scientific subjects tends to become constipated unless "one or two subjects of general education" are administered for the purpose of catharsis.—I am, etc.,

V. ISWARIAH, B.A., M.B., M.R.C.P.

Medical College, Andhra University, Vizagapatam, July 24th.

"Under the Influence"—of Carbon Monoxide

SIR,—Your readers are greatly indebted to Dr. F. A. L. Burgess for his report of a most important case in which the evidence points to the serious effects of CO in a motor driver. Nearly three years ago I wrote:

"In these days of motoring the CO fumes tend to produce anaemic conditions, because CO has a stronger affinity for haemoglobin than oxygen, and so the latter is driven away. Carbon monoxide acts solely by displacing oxygen from its combination with haemoglobin, forming a stable compound which is useless for oxygen-carrying purposes. The affinity of CO for haemoglobin is three hundred times as great as that of oxygen. If the normal 14 per cent. of oxygen be present in the alveoli and there be present only 0.047 per cent. of CO, the haemoglobin shares itself out equally between the two gases. Minute amounts of CO, if constantly maintained in the alveoli, can thus produce serious results.[1] . . . If CO_2 be present in larger amount than usual the stimulation of the respiratory centre by means of CO_2 is very important, because persons like miners exposed to the fumes of both CO and CO_2 have their respiratory centres so greatly stimulated that they inhale larger amounts of CO. It follows that if the percentage of CO in the air be small, nevertheless when CO_2 is present in large quantities the amount of CO inhaled is increased. This is a new point, and one which needs to be noted."[1]

In Dr. Burgess's case there was a leak in the exhaust, and so both CO and CO_2 were coming off together, and the driver was therefore liable to inhale more CO and CO_2 than usual. The driver had eaten supper and had a glass of beer, so that some of the oxygen in the blood was diverted for the purpose of oxidizing these products, thus depriving the nerve centres of oxygen they needed. The drinking of alcohol had obviously had an effect, and so had the eating of supper.

Hitherto emphasis has been laid on the acute effects of CO gas, although so many men are exposed in all sorts of factories to the inhalation of small quantities of CO over prolonged periods. Under such conditions CO is a cumulative poison, and owing to the displacement of oxygen the various organs are ill supplied with oxygen, while the blood gives evidence of anaemia. Tissues so under-nourished react badly to constant irritation by such agents as the tar and oil products as well as copper-nickel matter, so that ultimately an irritated area may become an ulcer of a chronic or even of a malignant character.

I have found that even in the best-appointed cars there is an escape of CO gas, and persons using saloon cars constantly for business purposes give evidence of a damaged blood as shown by the raising of both the systolic and the diastolic blood pressures.—I am, etc.,

Swansea, Aug. 9th. G. ARBOUR STEPHENS.

[1] *Medical Press and Circular*, September 20th, 1933.

Spanish Medical Aid Committee

SIR,—There is no doubt that the present conflict in Spain is causing terrible suffering, not only to those who are actively engaged in the civil war, but also to the civilian population in the affected districts, and medical help is urgently needed.

At a non-party meeting held in London on Saturday last it was unanimously decided that fully equipped medical units should be sent immediately from this country to Spain, and already in response to an appeal a large number of volunteers have offered their services. We take this opportunity of appealing for doctors, medical students, and nurses to volunteer for immediate service, and also to appeal more generally for donations towards the equipment of these units. Offers of personal assistance and donations should be sent direct to Spanish Medical Aid Committee, Kern House, 36, Kingsway, W.C.2.—We are, etc.,

E. P. POULTON. CHRISTINA HASTINGS.
GEORGE GRAHAM. CHURCHILL.
PHILIP ELLMAN. CHRISTOPHER ADDISON.
J. R. MARRACK. P. D'ARCY HART.

London, Aug. 11th.

Universities and Colleges

UNIVERSITY OF LONDON

Removal of Administrative Offices

During the week beginning August 17th the administrative offices of the University will be removed to the new University Buildings at Bloomsbury; persons having business with the departments of the University are advised to ascertain beforehand at which address the department in question is to be found. Communications should, up to August 21st, be addressed to South Kensington, S.W.7; and after that date, except in the cases noted below, to University of London, W.C.1. The postal address of the Bloomsbury offices will be University of London, W.C.1; the telegraphic address "University London"; and the telephone number Museum 8000. The main entrance for the present will be in Montague Place (opposite the north entrance to the British Museum). The nearest stations are Goodge Street and Russell Square; other convenient stations are Holborn, Euston Square, and Tottenham Court Road. The University Library will not be transferred until the New Year, and communications regarding the Library and books returned by borrowers should therefore be addressed, until further notice, to the University Library, South Kensington, S.W.7. Most University examinations hitherto held at South Kensington will for the present continue to be held there. Candidates and examiners will be informed of the place of examination in each case.

Recognition of Teachers

The following have been recognized as teachers of the University in the subjects indicated in parentheses:

Middlesex Hospital Medical School.—Dr. H. K. Graham Hodgson (Radiology).

King's College Hospital Medical School.—Mr. H. W. Davies (Radiology); Mr. H. L.-C. Wood (Surgery).

Amendment of Regulations

The second paragraph of the regulations for the M.B., B.S. Degree (*Red Book*, 1935-6, p. 276; *Blue Book*, September, 1935, p. 260) was amended to read as follows:

Candidates who pass in Anatomy and Physiology at the Second Examination for Medical Degrees, Part II, in July of any year will be permitted to enter for the Third Examination for Medical Degrees in May three years later, provided that they have attended a clinical course extending over not less than thirty-three months and that they have othewise complied with the Regulations.

Section 3 (viii) of the Regulations for the Ph.D. Degree for Internal Students (*Red Book*, 1935-6, p. 22) was amended by the addition of the following sentence at the end:

Candidates who hold the degree of M.D. or M.S. of this University will not be debarred from applying for registration as candidates for the Ph.D. degree.

It was resolved that the Regulations relating to the External Ph.D. Degree be amended (*Blue Book*, September, 1935, p. 787) by the deletion of paragraph (1) under the heading "Notes" and by the substitution therefor of the following:

Graduates holding a Master's Degree in any Faculty or the M.D. or M.S. Degree in the Faculty of Medicine are permitted to enter for the Ph.D. degree in accordance with these Regulations.

The Ph.D. Degree in Hygiene (non-clinical) in the Faculty of Medicine has been conferred on Winifred I. Strangeways (National Institute for Medical Research).

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

Surgery.—D. S. G. Genge, W. A. Royds, O. H. Saldanha.

Medicine.—S. M. Basu, G. E. N. Bird, J. W. Cazalet, J. A. G. Gulliford, R. P. Huggins, R. A. McMillan, N. Mukherjee.

Forensic Medicine.—G. E. N. Bird, J. W. Cazalet, G. K. Coombes, J. A. G. Gulliford, R. A. McMillan, N. Mukherjee.

Midwifery.—A. Bagon, R. F. B. Bennett, P. H. Denton, P. A. Dixon, M. M. El-Badri, P. A. Gardiner, H. D. Lamb, C. W. Mills, W. B. Perren, R. Robins-Browne, W. A. Royds, O. H. Saldanha, J. K. Sargentson, E. G. F. Skinner.

The diploma of the Society has been granted to S. M. Basu, R. P. Huggins, N. Mukherjee, and J. K. Sargentson.

The Services

DEATHS IN THE SERVICES

Surgeon Captain Richard Weld Stanistreet, R.N. (ret.), died on July 27th. He was educated at Charing Cross Hospital, and took the M.R.C.S., L.R.C.P.Lond. in 1896, after which he entered the Navy. He became surgeon commander on October 10th, 1910, and retired, with an honorary step as surgeon captain, on January 1st, 1925. He served throughout the war of 1914–18.

Colonel Napoleon Bisdee Major, late R.A.M.C., died at Hastings on June 19th, aged 91. He was born at Hungerford, Berks, on September 13th, 1844, was educated at St. Mary's, and took the L.S.A. in 1865 and the M.R.C.S. in 1866. After filling the post of obstetric house-surgeon at St. Mary's he entered the Army as assistant surgeon on October 2nd, 1866. In the old regimental days he served as medical officer of the 16th Lancers. He became colonel on November 30th, 1896, was on half-pay from November 6th, 1900, to January 4th, 1902, and retired on November 5th, 1902.

Major William Samuel Boles, R.A.M.C. (ret.), died on June 13th, aged 77. He was born on April 13th, 1859, and was educated at Trinity College, Dublin, where he graduated B.A., M.B. in 1883 and B.Ch. in 1884. Entering the Army as surgeon on August 12th, 1885, he became major on April 5th, 1899, and retired on August 13th, 1905. He rejoined for service during the war of 1914–18.

Captain Peter Shannon, Indian Medical Service, died at Masuri on May 25th, aged 35. He was born on April 26th, 1901, and was educated at Glasgow University, where he graduated M.B., Ch.B. in 1923. After holding the appointments of house-surgeon at the Birmingham and Midland Eye Hospital, and house-physician and surgeon at the Gloucester Royal Infirmary, he entered the I.M.S. as lieutenant on February 4th, 1929, his commission being antedated a year to February 4th, 1928. He became captain on February 4th, 1931, and last year took the diploma in Tropical Medicine and Hygiene of the London Colleges.

Medical Notes in Parliament

[From our Parliamentary Correspondent]

Measles no Longer Notifiable

The House of Lords, on July 29th, agreed to the Commons' amendments to the Public Health Bill. Explaining the amendment to leave out "measles" from the list of notifiable diseases under the schedule (Clause 343), Lord Onslow, as a member of the Joint Select Committee which had considered the Bill, said that committee had no intention of going to extremes in changing the existing law, but did not think that by including measles it exceeded that limitation. It was impressed by the high death rate from measles, and added it to the list of notifiable diseases to suggest that something should be done thereby to prevent the occurrence of so many cases. He understood, however, that considerable inquiry had taken place among medical officers and others conversant with the matter, and it concluded that on the whole it was preferable for measles not to be a compulsory notifiable disease. Power existed at present for any local authority to make it notifiable. In these circumstances he thought that the House of Lords should not insist on the retention of measles as a compulsory notifiable disease.

The House agreed with the Commons' amendment. Subsequently, on July 29th, the Bill received the Royal Assent.

Home Office Administration

On the third reading of the Consolidated Fund Bill in the House of Commons on July 30th, Mr. Rhys Davies opened a discussion on the administration of the Home Office. He quoted from the annual report of the Chief Inspector of Factories and Workshops a declaration that long hours worked in the Midlands were generally worked by the least physically fit of the industrial population, and called attention to instances given of long hours worked by boys, women, and girls. He asked the Home Secretary whether he was satisfied that the sections of the Factory Acts dealing with the fencing of machinery and the introduction of safety measures could not be improved. Fatal accidents in factories and workshops during 1935 were 843 against 785 in 1934. Non-fatal accidents increased from 136,073 to 148,853. These figures disclosed an appalling situation. Factory employment in this country was becoming as dangerous as coal-mining. Speeding-up processes were such that human beings attending some of the new machinery were incapable of following the speed of the machine.

Mr. R. D. Denman dealt with the long hours worked by young persons in factories. Mr. Jagger praised the work of the factory inspectorate, but said they numbered about 250 for about 5,250,000 workers. A well-organized trade union found that it required one full-time official for every 2,000 workers, whereas the proportion of factory inspectors was one to 225,000 people.

Medical Referees

Mr. T. Cassells spoke about medical referees. He said the scope of the investigations of a medical referee should be restricted to exclusively medical facts, but practice rode roughshod over the Act of Parliament. At present, to a large extent, the duties of arbitrator or judge in first instance had devolved upon the medical referee. Mr. Cassells said he understood that as a result of questions put by him to the Minister inquiries were proceeding with regard to medical referees and that on cause shown appropriate steps might be taken. He was not casting aspersions on medical referees, but unfortunately those who were employed repeatedly by insurance companies and employers unwittingly obtained the employers' point of view, and when a case came before them in which there was any doubt the workman did not get the benefit of the doubt.

Sir Arnold Wilson said that many members had experience of the work of medical referees, often with admiration, but sometimes with critical feelings. They nearly all agreed that a change must come, but the subject was under investigation by a Home Office committee and he should not say more on it. Few of them were satisfied with the working of

the Workmen's Compensation Act, but that was also under close examination in certain of its aspects by a Home Office committee. It required a close overhaul to be brought into touch with modern conditions. He was delighted to hear of a new Factory Bill, and as chairman of the Advisory Committee of the Board of Trade on the cinematograph industry he hoped the suggestion would be considered that this industry should be included in the Bill in some of its aspects.

Mr. TINKER said there was much dissatisfaction over the fact that only one medical referee decided a man's case. A medical referee might be in ill humour when the man attended. That might make no difference to the judgement, but if the man was treated discourteously during his examination he came away with the impression that he had lost his case because the referee was out of humour. If there were three medical referees the man would not feel that the prejudice of a particular referee had decided the case. The present position about certifying surgeons was serious because a certifying surgeon might have been engaged by the employers. It was difficult to get men to believe that a doctor acting for the employers could be fair to them when they went before him to get a certifying surgeon's note.

Mr. ALFRED SHORT said that as a result of practical experience he agreed with what had been said about the feelings generated in connexion with medical referees, and that it was unfortunate that the sole decision should rest with one medical referee. He was not satisfied that the statistical report of the Home Office on Workmen's Compensation gave a complete statement of the facts. He would like to see an effort made to rehabilitate injured workpeople.

Government Reply

Mr. GEOFFREY LLOYD, replying for the Government, said the Home Office had the question of lighting of factories in mind, and would also consider a proposal for propaganda work made by Sir Arnold Wilson. All must deplore the increase in industrial accidents of 9 per cent. over the previous year, but making allowance for the increased number at work the accident rate was a little lower. Many of the disquieting features in the report of the Chief Inspector of Factories this year were the reverse side of the industrial revival. It was satisfactory that the accident rate should be a little smaller than in 1934, having regard to the longer hours worked and more overtime. Since 1924, when practically the same number of people were employed, there had been a 20 per cent. reduction in the accident rate. The Home Office inspectors were active in seeing that the provisions of the law about the fencing of machinery were complied with. Only one-third of the total number of accidents were in connexion with machinery. The real task was to achieve co-operation between employers and employed in the maintenance of careful methods of work. The excess rate of juvenile accidents gave concern, and action had been taken. A meeting at the Home Office with the National Confederation of Employers' Organizations had set up a special committee with the Chief Inspector of Factories in the chair to devise a memorandum on the prevention of juvenile accidents. The Home Office deplored the excessive hours worked by women and young persons, but in most cases the hours did not exceed forty-seven or forty-eight a week. The examples given in the report were bad cases in which prosecution had followed. Where the long hours worked in some parts of the country were not definitely illegal, he could only say that the matter of hours would be dealt with in the Factory Bill which was to be brought in in the next session. The present legal limit would be substantially reduced. Mr. Cassells and other members had raised the question of examination of men by employers' doctors, and also the question of medical referees and the difficulty of persons who suffered from industrial diseases getting employment again. The schedule of industrial diseases had also been brought up. If Mr. Tinker would give the Home Office information in regard to any disease which he thought should be scheduled the question would be gone into carefully. A committee under the chairmanship of Sir Humphry Rolleston was appointed to advise on any proposals of this kind and would give fair decision. Almost all the other points raised were now under consideration of a committee presided over by Judge Stewart.

Mr. TINKER asked how far the committee could inquire into examination by employers' doctors.

Mr. LLOYD said he appreciated the feelings entertained in regard to one man being the arbiter in these matters. The position in cases of miners' nystagmus and the position of the man who had to declare to an employer whether he had the disease were now being sympathetically considered by the committee to which he had referred. He suggested to Mr. Tinker and Mr. Cassells that they should give evidence before that committee. Silicosis was a terrible industrial disease, but some progress was being made against it. The statistics must not be taken to indicate that there was no improvement as regards exposure to dust. Many cases now coming forward revealed conditions that existed in industry before the disease was recognized. Improvements had been made as a result of regulations made under the powers possessed by the Home Secretary. Medical examination of new entrants and periodic medical inspection of workers in the more dangerous occupations, as required under the Order, revealed whether conditions still gave rise to the disease and enabled precautions to be taken. Experiments were being made by some pottery manufacturers to see whether the use of flint, one of the chief causes of silicosis, could be eliminated. Unfortunately, although there was technical progress in the use of alumina, doctors were not convinced that alumina itself did not conduce to serious disease. The Home Office could not make recommendations till that had been cleared up. Mr. Short and Mr. Acland had asked about the present position of air raid precautions. Even against the slightest risk the Government must take precautions, and these could not be improvised. The effect of a gas attack on an unprepared and ignorant population would be terrible, but this lost some of its terror when faced and understood. Non-persistent gases were soon dispersed by wind or by currents of air in the streets. Persistent gases, which were liquids which could vaporize a gas, could contaminate an area and have a lethal effect for several days. They would disappear at different rates according to the weather. To deal with these problems the country must have a warning system, a control of public lighting, and a trained service capable of finding when gas was about and what gas it was. There was also repair and maintenance of roads, decontamination of material from persistent gas, and the treatment of casualties. The Home Office had sought the co-operation of local authorities in provision of these services. This co-operation as a whole had been satisfactory. Officials of the Air Raid Precautions Department visited every principal local authority during the year. Schemes were sent to the Department and examined. The anti-gas school at Falfield opened in April, and 150 instructors had passed already. Accommodation at this school would be doubled and a further anti-gas school of a similar capacity would be opened in the North of England. All the instructors for the Metropolitan Police had been trained. In a relatively short time the number of men trained on a "snowball" basis could rise to hundreds of thousands. The Home Office had ordered forty mobile anti-gas chambers, and each class which was trained by an instructor would have a practical demonstration of respirators in an anti-gas chamber. Respirators in a concentration of poison gas afforded a protection which was 100 per cent. efficient against all gases known to the Government which were likely to be used in war. Experts of the Chemical Defence Research Department had enabled a simplified type of respirator to be mass-produced without in the least sacrificing efficiency. A factory had been bought and arrangements for production were being undertaken speedily. No other country was in process of making such comprehensive provision for protecting the civil population against this danger.

The House read the Appropriation Bill a third time.

Mastitis in Maternity Cases.—On July 28th Sir KINGSLEY WOOD told Mr. Marklew that figures showing the incidence of mastitis in maternity cases were not available. When the occurrence of a series of cases of mastitis among maternity patients was reported to his Department, with a request for assistance or advice, special investigations directed to the possible causes of the outbreak were carried out by his medical officers. Recommendations were made as to the action to be taken to prevent the spread of infection, and, so far as was practicable, to avoid future outbreaks.

Obituary

MARY CHALMERS WATSON, C.B.E., M.D.

Late Senior Physician, Edinburgh Hospital for Women and Children, and Chief Controller, W.A.A.C.

We regret to announce the death of Mrs. Chalmers Watson, the first woman to graduate in medicine at the University of Edinburgh, who was chief controller of the Women's Army Auxillary Corps in 1917–18, and, notwithstanding ill-health, served on the Departmental Committee on Scottish Health Services whose important report appeared a few weeks ago. She died on August 7th at the home of her brother, Sir Auckland Geddes, G.C.M.G., M.D., at Rolvenden, Kent.

Alexandra Mary Campbell Geddes (known as Mona to her friends) was born in India in 1873, the daughter of Auckland Campbell Geddes, C.I.E. From St. Leonard's School, St. Andrews, she went to study medicine at Edinburgh, graduating M.B., C.M. in 1896, and proceeding M.D. in 1898. On the day she was "capped" as M.D. she married Dr. Chalmers Watson, now consulting physician to the Edinburgh Royal Infirmary. She spent a year in London as physician to the maternity and district nursing institute at Plaistow and six months at Dr. Barnardo's Homes in Kent. She then practised in Edinburgh for some years and assisted her husband in editing the *Encyclopaedia Medica*, contributing to it the article on invalid feeding. The first edition appeared in 1900. About that time she was appointed to the medical staff of the Edinburgh Hospital and Dispensary for Women and Children, and eventually became senior physician.

Mrs. Chalmers Watson played a vigorous part in various women's organizations and in social service of many kinds. She had been joint honorary secretary of the Scottish Central Council of the Queen's Institute for District Nursing, president of the Edinburgh Women Citizens' Association, and first president of the Scottish Women's Hockey Association, and in later years she was president of the Women's United Services Club and a manager of the Edinburgh Royal Infirmary. During the latter part of the war, when her brothers, Sir Eric and Sir Auckland Geddes, were holding Cabinet office, Mrs. Chalmers Watson was asked by the Army Council to visit France with a view to advising in what ways other than nursing women could help the Army. She drew up a scheme and was appointed the first Chief Controller of the W.A.A.C. Her organizing ability in the service of the State was recognized by the award of the C.B.E. in 1917, and her portrait, painted by F. A. Walton, is included in the National War Museum in London. During recent years she had been a member of the Standing Committee on Health Services appointed by the Department of Health for Scotland. Last May she was elected president of the Medical Women's Federation, whose meeting at Edinburgh in 1937 is being arranged on international lines.

In the course of a personal appreciation in the *Scotsman*, "I. V.," a lifelong medical friend, writes:

The first stunned reaction to the news of Mrs. Chalmers Watson's death is the inevitable thought—What are all the women's organizations in Edinburgh going to do without her? Societies, hospitals, Queen's Nurses, Boards were upheld by her support and inspired by her practical energy. Notable for clear thinking as she was, her opinion had a weight beyond her own estimate of it, and she was sought to give her services in committees and conferences as much for her wise advice as for her gift for public affairs. All-round ability was perhaps her most marked characteristic, and it was combined with a pleasant and sympathetic temperament which made her easy to get on with in the business of public life.

She would have been a great woman physician had she devoted herself exclusively to her profession—she never wholly let it go. As a hostess she was charming, and gifted with a natural ease and grace which fitted her socially for the encounters of a life that to-day might mean contacts in high places and to-morrow friendly talk with the homely men and women of her country place.

O. INCHLEY, M.A., M.D.

Late Lecturer in Materia Medica and Pharmacology, King's College, London

Dr. Orlando Inchley, who died at his residence at Totteridge on August 3rd, was a scholar of St. John's College, Cambridge, where he obtained a first class in the Natural Sciences Tripos in 1899. His medical school was St. Bartholomew's, whence he obtained the M.R.C.S. and L.R.C.P. in 1900, graduated M.B. and B.Ch. in 1901, proceeding M.D. in 1905. For many years he was assistant to the Downing professor of medicine at Cambridge, working in close collaboration with the late Professor Walter E. Dixon, whom he succeeded in 1920 as lecturer in pharmacology at King's College, London University, a post from which, owing to ill-health, he retired in October, 1935. He had been examiner in pharmacology to the Universities of Cambridge and London and to the English Conjoint Board.

Widely read and travelled, Inchley devoted his life to research, and was one of the earliest workers on the subject of histamine shock. As a teacher he endeavoured to impress upon students the importance of using drugs which had stood the test of prolonged clinical experience, and he deprecated any tendency to accept without question preparations which did not fulfil such a test.

Dr. Inchley joined the British Medical Association in 1903, and was honorary secretary of the Section of Physiology, Pharmacology, Therapeutics, and Dietetics at the Annual Meeting held in 1921 at Newcastle-upon-Tyne. In 1914, and again in 1919–20, he was a B.M.A. research scholar, and he received a grant for scientific work from the Association in 1923. His published papers include one on the influence of the electric current on the adsorption of drugs (*Journal of Pharmacology and Experimental Therapeutics*, November, 1921), based on work undertaken during his tenure of a B.M.A. scholarship; also a description of a simple myocardiograph in the *Proceedings of the Physiological Society* (January, 1923), and a valuable report on histamine shock (*Journal of Physiology*, April, 1926).

Professor R. J. S. McDowall writes:

To his subject Inchley contributed in many ways. His best-known researches were those on the action of histamine on veins, but his ingenious apparatus is in many laboratories. In his teaching his pharmacological demonstrations were outstanding, as they deserved to be, for they were the result of meticulous care in preparation; they were the admiration of all who had the privilege of seeing them. Only a year or so ago a prominent member of the Inter-University Committee on Medical Education, doubtful of the value of pharmacological experiments, came specially to see Inchley's demonstrations for several weeks. He departed well convinced of the value of such teaching to medical students. But it is the friend Inchley that so many will remember, for his ample presence radiated geniality and kindness. No meeting was unaware of his presence if only because of his whole-hearted infectious laughter. When he felt strongly he spoke with a conviction which demanded attention. As a man of the world he understood men, and this was much appreciated by his colleagues and students alike. At King's he had a host of friends, and none will hear of his death without a sincere regret that one who has added so much to happiness should have departed so soon.

JOHN KEAY, L.R.C.P. and S.Ed.

Consulting Surgeon, Stockport Infirmary

Dr. John Keay, honorary consulting surgeon to the Stockport Infirmary, died at his residence in Southport on August 7th at the advanced age of 81. He had been a member of the British Medical Association for fifty-three years. A student of Owens College, Manchester, he took the double Scottish qualification at Edinburgh in 1881. Thereafter he served as house-surgeon at the Manchester Royal Infirmary, and later held a similar appointment at Stockport Infirmary. He then joined the late Dr. Edwin Rayner in partnership in Stockport, and after a time was appointed to the honorary staff of the Infirmary. His professional ability, his dignified personality, charm of manner, and his keen yet sympathetic knowledge of human nature made him not only a popular practitioner but also a much-sought-after consultant. Owing to indifferent health he retired from practice in Stockport in 1901, and for some years lived in semi-retirement at Folkestone.

As a young man Dr. Keay held a commission in the 4th Battalion Cheshire Volunteers. He loved the Army—soldiering was in his blood. His grandfather, a Scot from Blairgowrie, served with the 71st in the Napoleonic Wars. The great war found John Keay a semi-invalid; almost an old man settling down to the comfort of his armchair and the study of literature. Yet early in 1915, at the age of 60, he "lost" his birth certificate and received for the second time H.M.'s Commission, this time in the R.A.M.C. Most of his war service, which extended from 1915 to 1920, was spent at the Queen Mary Hospital, Whalley, Lancs. Here, in addition to having charge of wards, he was O.C. of an R.A.M.C. detachment. This was probably the happiest time of his professional life. With his men he was popular; his military bearing and sense of discipline and duty were balanced by a greater sense of justice and humour. Above all, his unerring instinct as to when to turn a blind eye endeared him to all under his command. Last Christmas he received no less than forty letters and cards from those whom he always referred to affectionately as "the Whalley Boys." To his widow, son, and daughter we extend our sympathy. *Ave atque vale.*

D. K. McD.

Dr. Samuel Solomon Mallinick, who died at Johannesburg last month, was born on February 21st, 1887, at Telz, in Russia, and received his education in Russia, Germany, and England. He qualified with the English conjoint diploma in 1915, and went to South Africa five years later, after holding appointments at St. Mary's Hospital, Brompton, and Croydon. He rapidly established a large practice at Johannesburg, where he was deservedly popular. He was a member of the local scientific and technical club, and a man of wide cultural interests. A colleague writes: Dr. Mallinick's noble ideals, his deep knowledge of art and science, his keen desire to learn and acquire more knowledge, not for the sake of material gain, but for the betterment of himself and humanity, stamped him as an outstanding figure in this materialistic world where spiritual and cultural qualities count for so little. If one recalls the fact that he was interested in reading the Koran in the original Arabic, Aristotle in ancient Greek, the Talmud in Aramic, besides being deeply interested in modern sciences and languages, one must admit that Mallinick was an erudite man. Very often I visited his surgery, and invariably found on his desk magazines, papers, books in so many different languages, and yet he always found time to enlarge the scope of his ideas away from the everyday worries. I had the privilege to read a letter dictated by him to a friend just a week before his death, and was deeply moved by the profound philosophical thought expressed in it, while the writer was on the threshold of the life above. He diagnosed his own case and signed his own death warrant, and yet he refused to take any drugs to alleviate his pains, because he wanted to retain his mental faculties to the very end. He lived as a virtuous and simple man, and died as such. He was a keen supporter of the British Medical Association, and never failed either to attend a meeting or to take part in the discussions. He contributed to scientific and medical papers, and before his death was writing a book on blood pressure.

Many members of the profession will learn with regret of the death of Dr. Victor Alexander Jaynes, who practised formerly in Jamaica Road, Bermondsey. He died on July 22nd in his eighty-fourth year. Dr. Jaynes studied medicine at Guy's Hospital, qualifying as M.R.C.S. and L.S.A. in 1877. He was for many years a certifying factory surgeon, public vaccinator for Bermondsey, and examiner in and teacher of vaccination. He had been surgeon to the St. John Ambulance Association, and was a former president of the Metropolitan Police Surgeons' Association. He joined the British Medical Association as long ago as 1885. Dr. Jaynes was best known to the profession through his long service to the Medical Defence Union; he was a member of its council for over forty years, and had occupied for thirty years or more the position of honorary secretary. During the late Dr. Neal's holidays he often deputized for him at the office. In conjunction with Dr. W. S. A. Griffith he wrote the history of the Medical Defence Union which appeared in the annual report published in 1935, the jubilee year of the Union's foundation; he was a member of the Finance Committee for many years, and always showed keen interest in anything that would forward the success of the financial policy of the M.D.U. He was a very loyal Guy's man, and taught vaccination to many generations of medical students there. Even after his eightieth birthday he retained the youthfulness of outlook and of expression which was an outstanding characteristic of the man. About six weeks before his death he was knocked over by a motor car and suffered a broken leg, for which he was treated in Guy's Hospital.

We announce with regret the death at the age of 71, at his home in Loughton, Essex, of Dr. Arthur Butler Harris, T.D. He studied medicine at Oxford; at University College, London, where he won the Liston gold medal; and later at Leipzig. He graduated M.A., B.M., B.Ch. at Oxford in 1892, and was for some time senior resident medical officer at the Stamford Hill Dispensary. In 1900 he was appointed medical officer of health for Loughton, later becoming medical officer to the Post Office and the Board of Education. After the war he retired from the R.A.M.C.T. with the rank of lieutenant-colonel, and became county controller for the Essex V.A.D. A man of wide interests, Dr. Harris had been in his earlier years president of the Oxford University Junior Science Club, and he was a prominent Freemason, achieving finally the Assistant Provincial Grand Mastership of Essex. He had been chairman of the local branch of the British Red Cross, and was for many years a member of the British Medical Association. He contributed several articles to this and other journals on the use of tuberculin and bacterial vaccines, especially pneumococcal vaccine as applied in the treatment of acute pneumonia. In October, 1931, he was appointed Deputy Lieutenant for the County of Essex.

We announce with regret the death at Hornsea, Lincolnshire, on August 8th of Dr. Henry Douglas Johns, aged 74. He graduated from Durham University with the degrees of M.B., B.S. in 1891, after taking the M.R.C.S., L.R.C.P. diplomas in 1889, and proceeded to the M.D. Durham in 1901. He held junior resident appointments at Charing Cross Hospital and later at Newcastle-upon-Tyne before settling in Hornsea, where he was medical officer of health for about thirty years.

Dr. Johns retired from practice about ten years ago, but maintained his interest in the work of the Hornsea and District War Memorial Cottage Hospital and in other local institutions. He became a member of the British Medical Association in 1895, was chairman of the East Yorkshire Division 1910–11, and president of the East Yorkshire and North Lincolnshire Branch in 1912. A man of wide and varied interests with a pleasant personality his death will be regretted by many friends in and outside the profession in Yorkshire.

We regret to announce the death of Dr. S. H. B. ALLISON of Killaloo, Co. Derry, on August 2nd. He graduated B.A. of the Royal University of Ireland in 1886 and was a medical student at Edinburgh University, where he obtained the M.B., B.Ch. degrees in 1894. After a period of post-graduate training he returned to Derry to succeed his father in the dispensary district of Claudy and Parke some forty years ago. There he resided and practised his profession consistently for forty years, and his passing is mourned by those whom he knew as patients and friends. Dr. Allison was an active member of the Londonderry Division of the B.M.A., and always took a deep interest in its activities and the profession which he honoured for so long. He joined the Association in 1896, and had held office as president of the Londonderry Medical Society on a number of occasions. One who knew him well records that he was held in high esteem by his medical colleagues in the North of Ireland, among whom his loss will be keenly felt.

We announce with regret the death on July 31st of Dr. HENRY MELLOR FORT, who graduated M.B., Ch.B. of Manchester in 1906. He was a house-surgeon at Manchester Royal Infirmary before practising in succession to his father in Oldham. He was police surgeon at Bolton, a medical referee for the Ministry of Pensions, certifying factory surgeon for the district, and he only lately resigned his position as honorary surgeon to the Oldham Royal Infirmary. He had a long connexion with the local Volunteers and Territorials, and had been a member of the British Medical Association for over twenty years. His death, which ended a long illness, will be deeply regretted by many friends and patients in Oldham and the surrounding districts.

Dr. JOHN HUTCHISON died at Chamba, India, on July 24th, aged 88. For over sixty years he was a medical missionary, first at Sialkot, and then at Chamba, mission stations of the Church of Scotland in the Punjab. Immediately after qualifying L.R.C.P. and S.Ed., at the age of 21, Dr. Hutchison proceeded to the mission field, and for ten years was the only medical man in the Chamba and Kangra district. On his retirement over six years ago he was awarded the Kaisar-i-Hind medal in recognition of his work. He continued to live and work at Chamba until the end, especially among lepers. He was keenly interested in geology and archaeology, and was associated for a time with Sir Aurel Stein in his researches in the Punjab. He also investigated the history of the States of the Outer Himalayas and made valuable contributions to gazetteers. A feature of Dr. Hutchison's long service was the arduous journeys which, year by year, he made among the high mountain ranges of the Himalayas, carrying succour to the far-distant dwellers therein. He is survived by his two daughters, one of whom is Dr. Alice Hutchison, physician to the Children's Department at the Institute of Medical Psychology.

Mr. CLAUDE WRIGHT, general secretary of Dr. Barnardo's Homes, died on August 2nd. He joined the staff of the homes forty-five years ago, and was appointed the first registered secretary when the National Incorporated Association was formed. For many years Mr. Wright had worked as personal secretary to the late Dr. Barnado, and his thorough knowledge of the work, his business capacity, and courtesy played no small part in establishing the homes on their present firm basis.

Medical News

Courses of instruction for medical practitioners, psychologists, social workers, and teachers will begin in September at the Institute of Child Psychology, 26, Warwick Avenue, W.9. A one-year post-graduate course has been arranged for those who hold the D.P.M., or have completed the two-year course of training at the institute, or have had adequate experience in the psychopathology of childhood. Clinical assistantships in the medicine of childhood are available. Full particulars are obtainable from the secretary of the institute. Research students may be admitted at any time subject to the approval of the directors. Applications for membership of the courses should be accompanied by details of the candidate's attainments and experience, with two testimonials as to general ability and character.

The first Congress of the Society of German Urologists will be held at Eisenach from October 1st to the 3rd. Further information can be obtained from Dr. Heusch, Augustenburger Platz 1, Berlin, N.

The fifteenth Congress of the Italian Urological Society will be held at Trieste from October 1st to 4th, under the presidency of Professor Carlo Ravasini, on the occasion of the fortieth anniversary of the foundation of the urological department, founded by Nicolich. The subject for discussion will be the early diagnosis of renal tuberculosis, introduced by Dr. M. Novak of Trieste and M. Bonino of Turin.

The first European Congress for Cosmetic Surgery will be held on October 3rd and 4th at Brussels. Further information can be obtained from Dr. Coelsl, 118, Avenue Louise, Brussels.

A party of 120 public schoolboys—the largest expedition organized by the Public Schools Exploring Society—sailed from Hull on August 5th for a visit to Lapland. The leader of the party is Surgeon Commander G. Murray Levick, R.N. (ret.), who accompanied Captain Scott's Antarctic expedition as medical officer and zoologist in 1910–13.

The medical and surgical staff of Leicester Royal Infirmary are making arrangements for a gathering of past resident officers of the institution. The chairman of the honorary staff (Mr. W. I. Cumberlidge, senior surgeon) has sent a letter to over three hundred whose names and addresses have been traced intimating a proposal to hold a reunion dinner at the Grand Hotel, Leicester, on October 2nd next. Every endeavour has been made to trace all past resident officers, and an announcement of the dinner appeared in our advertisement pages last week in the hope that those who had not already received particulars would apply to the secretary of the residents' reunion, who informs us that he has already received a good number of acceptances.

Mr. J. Basil Buxton, M.A., F.R.C.V.S., professor of animal pathology and director of the Institute of Animal Pathology in the University of Cambridge, has been appointed acting principal and acting dean of the Royal Veterinary College from September 25th, and to succeed Sir Frederick Hobday as principal and dean when Sir Frederick retires after the opening of the main block of the new college buildings.

On the occasion of the Olympian games the *Deutsche medizinische Wochenschrift* has issued a special number with separate pagination devoted to the medicine of sport, and the issue of the *Münchener medizinische Wochenschrift* of July 24th is devoted to the same subject.

The issue of the *Bulletin de l'Office International d'Hygiéne Publique* for July is devoted to yellow fever, and that of *Deutsche medizinische Wochenschrift* for August 1st to poliomyelitis.

On July 1st a law for compulsory insurance against industrial accidents and occupational diseases came into force in Italy.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to **The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.**

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QUERIES AND ANSWERS

Lemon Juice in Mycotic Infections

Dr. L. G. Austin (Wellington, New Zealand) writes: In your issue of February 29th (p. 404) Dr. John C. Belisario stressed the claims of lemon juice as a cure for mycotic skin infections. For symptoms of intense irritation, etc., I tried the dabbing on of lemon juice in a case of pruritus vulva with immediate relief and cure. Previously I had relieved the same case with weekly injections of 1 per cent. novocain solution, eight injections of 1 c.cm. each week for four to six weeks. The lemon juice treatment was certainly easier though less lucrative. The next case was a varicose ulcer with a weeping eczema. I had tried several elastoplast bandages, quinine urethane injections, calamine lotion, scarlet red ointment, and other preparations. In desperation I recommended applications of lemon juice, and within a few days the eczematous condition dried up and the ulcer healed; the same intense itching had been present in this case. Now I wonder whether lemon juice would clear up eczema of the ear lobes, leucorrhoea, and other vaginal lesions, and whether the mycotic infection which is common to the webbing of the toes is spread by the patient's fingers to other parts of the body?

LETTERS, NOTES, ETC.

Fate of a Snake

Brigadier-General F. E. Burnham (Halcyon Springs, B.C.) writes: In my bag of reminiscences of the practice of medicine in many lands I find a number of interesting cases. Quite the most interesting and instructive is that of Mrs. J.—the intelligent wife of a prosperous farmer. Mrs. J. came to our office in Southern Manitoba complaining of abdominal pain. For this, at different times, we removed the appendix, ovaries, and curetted the uterus. It was before the theory of focal sepsis held the stage, otherwise we would probably also have removed teeth, tonsils, and gall-bladder. Having removed all the organs with which the patient could dispense, and without improvement, we were fairly stumped. Except for the surgical adventures to which the patient was subjected, we shall allow the patient to relate the history of the case in her own words:

Kaleida, January 6th, 1936.

"Twenty-seven years ago, on a hot summer day, I went with a party of girls to pick berries in a deep ravine. It had been a dry season, and the creek running only in places. The day was very hot, and we were all thirsty. There was nothing to drink out of—only lie on our stomach. I picked a place beside a big rock. When I had my head in the right position a girl put her foot on me and pushed me into the water. I swallowed everything I came to, and think I must have swallowed a small snake. I tried many times after, and found one can easily swallow a small pliable thing. I did not have any trouble to speak of until winter. I found I had begun to be troubled with constipation, and nothing seemed to help much. As winter approached began to have bloating feeling and very miserable. If I stood up, walked around, or lay flat was not so bad. Bending down or sitting was misery. In January was in bed a long time. Doctor thought it was ovary trouble, and perhaps another operation. I told him I had another heart. He smiled, and said 'Where?' I showed him right side of abdomen. It beat and beat—you could see it. He said that was strange and must be a muscle. I often wondered since if it was tail of snake. One Saturday in May I really thought I would die I was so sick, and vomited so badly. Following Monday I passed a snake, badly decomposed. The head was firm with two eyes, as large as my thumb. It was colourless, and eighteen inches long. Immediately all pain and discomfort left me and have never had a return, and am in perfect health ever since. Weigh 140 lb. and do all my own work, and we farm 480 acres. We took the specimen to Dr. ——. It nearly filled a pint sealer. Dr. —— put it in a kidney dish, and in examining it tore it to pieces. I was really vexed, as I planned on keeping it."

By the misdirected zeal of a young practitioner the pathological museum has been deprived of an interesting exhibit.

The School as a Nursery.

The care and training of children under 5 years of age is attracting a great deal of attention. The Board of Education in a recent circular stated that "in normal circumstances children under 5 years of age benefit more from being in their home surroundings, under parental care, than in school," but that there are "many young children whose mothers, through no fault of their own, are unable to give them at home the care and attention they need," and that the provision of nursery schools, or nursery classes attached to elementary schools, was desirable to meet the needs of such children. Local education authorities were accordingly asked to survey their areas from this point of view and to consider what new provision was required. The Board has now prepared an illustrated pamphlet—"Nursery Schools and Nursery Classes" (H.M. Stationery Office, 1s. 6d.)—which, by surveying present practice, particularly with regard to nursery classes, offers a clearly written guide to local education authorities on the provision or adaptation of premises and to teachers on the practice and purpose of nursery training. Ten pages are devoted to ways in which premises, sometimes forbidding, may be adapted to serve the needs of young children between 3 and 5 years of age. There is no elaboration of educational theory in academic terms, but a straightforward account of what young children are like and what they enjoy; and of how their daily needs and interests can be met in such a way that necessary domestic activity and play become almost inseparable, and, together with rest, constitute the major part of the child's daily life, spent under conditions which ensure both care and training.

Mistaken Identity

The issue of the *Münchener medizinische Wochenschrift* for July 31st contains the following remarkable statement: "The celebrated English surgeon Moynihan, who has the title of Lord Dawson of Penn, has obtained the rank of a Viscount."

Jewellery Found at Annual Meeting

Dr. F. G. Hobson (Oxford), writes: The Bursar of St. Peter's Hall, Oxford, informs me that two pieces of jewellery have been found in the college, and suggests that they may have been dropped by a lady accompanying a member to the Annual Meeting. The Bursar's description of them is as follows: (1) round silver filigree brooch set with brilliants; one large oval brilliant in the centre, surrounded by five silver filigree daisies. (2) Earring with screw clasp for ear; looks like silver globe; possibly glass coated with silver.

Corrigendum

In the article by Dr. Leyton (August 1st, p. 238) the word "*hypo*tonic" appeared, through a misprint, instead of "*hyper*tonic," in relation to treatment by saline baths.

Vacancies

Notifications of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 38, 39, 40, 41, 42, 43, 44, 45, 48, and 49 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 46 and 47.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 123.